Technical
COMMUNICATION

Journal of the Society for Technical Communication

**Communicating
Public Health
and Safety
in a Crisis**

Technical COMMUNICATION

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What is a technical communicator? Technical communicators develop and design instructional and informational tools needed to ensure safe, appropriate, and effective use of science and technology, intellectual property, and manufactured products and services. Technical communicators combine multimedia knowledge and strong communication skills with technical expertise to provide education across the entire spectrum of users' abilities, technical experience, and visual and auditory capabilities. For more information visit www.stc.org/about-stc/defining-technical-communication.

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About the Journal

Technical Communication is a peer-reviewed, quarterly journal published by the Society for Technical Communication (STC). It is aimed at an audience of technical communication practitioners and academics. The journal's goal is to contribute to the body of knowledge of the field of technical communication from a multidisciplinary perspective, with special emphasis on the combination of academic rigor and practical relevance.

Technical Communication publishes articles in five categories:

- Applied research – reports of practically relevant (empirical or analytical) research
- Applied theory – original contributions to technical communication theory
- Case history – reports on solutions to technical communication problems
- Tutorial – instructions on processes or procedures that respond to new developments, insights, laws, standards, requirements, or technologies
- Bibliography – reviews of relevant research or bibliographic essays

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Miriam F. Williams, Editor

To Pen Bridges

In PEN/Open Book Award winner Nelly Rosario's essay, "This Bridge Called My Pen," Rosario explained how she, a Black Latina trained in engineering and creative writing, bridged "multiple disciplines, cultural traditions, and linguistic tools" with this simple phrase: "I like bridges." Rosario concludes her powerful essay by encouraging technical communicators to "Go forth and continue to pen bridges across disciplines."

As someone who transitioned from a career in policy implementation to technical communication, I see great value in bridging disciplinary and professional divides. I, too, like bridges. Before teaching and conducting research in higher education, I worked in Austin, Texas as a project manager tasked with managing the rewrite of hundreds of health and safety regulations from legalese to plain language. In my efforts to better understand plain language, collaborative writing, and technical editing, I often consulted this journal, *Technical Communication*. I found the articles based on sound research and still practical enough to share with my colleagues who were attorneys, budget analysts, and policy experts. For me, a practitioner trained in Economics and Public Administration, *Technical Communication* was my introduction to our field and discipline.

In his February 2007 editorial, "Why Should STC Publish a Journal," former *Technical Communication* Editor-in-Chief Dr. George Hayhoe wrote, "Technical Communication has the distinction of being the longest running professional publication in our discipline" and noted that "25% of the authors published in our pages in 2006 were practitioners." As incoming Editor-in-Chief of *Technical Communication*, I encourage practitioners, from STC's international membership as well as the journal's international audience of scholars from academic institutions around the world, to continue to submit your manuscripts to *Technical Communication*. Your knowledge and contributions to the field's growth are vital to our discipline and our field. My vision for *Technical Communication* is that we not only continue the legacy of the journal as an international resource for practitioners and academics but make it a space where we strengthen our relationship through collaborations and lesson drawing. Lesson drawing is a public policy term that simply means that we make active choices to learn from one another. As in most disciplines, there is a certain distance between those who work in higher education and practitioners in industry, government, non-profits, and in the community.

One means of strengthening academic-practitioner relationships is to encourage more research collaborations between those of us who conduct research in higher education and those of us who conduct research in industry, in the community, and in government. These types of collaborations are not new in our field and modeled by *Technical Communication*'s most recent Editor-in-Chief, Dr. Sam Dragga, in "Cruel Pies: The Inhumanity of Technical Illustrations," which was published in the August 2001 issue of *Technical Communication*. This important article is a collaboration by Sam Dragga with Dan Voss, who was at the time an STC Orlando chapter member and a communications manager at Lockheed Martin Missiles and Fire Control. This type of collaboration may require practitioners, who in this field are uniquely qualified to publish and conduct research, to reach out to academics with research ideas to address problems or highlight innovations in industry and government. These types of collaborations, even if small in number, may require researchers in higher education to look for opportunities to do more than study practitioners as participants or sites of inquiry, but to find ways to conduct research together. Of course, there is still great value in research conducted exclusively by those in higher education or exclusively be practitioners, as long as we are in conversation.

Though I view practitioner-academic collaborations in research as a central part of my vision for the journal, as a scholar and practitioner with a commitment to social justice, I will also work hard to build on Dr. Sam Dragga and the *Technical Communication* Editorial Advisory Board's efforts to fulfill the journal's important mission, which is "to cultivate informed practice by disseminating pertinent research and scholarship in the field. As part of our mission, we acknowledge the value and dignity of all individuals and strive for an environment of social justice that respects diverse traditions, heritages, and experiences."

I have had the privilege of knowing Dr. Sam Dragga since my doctoral studies at Texas Tech University and published my first book under his mentorship when he served as editor of Pearson's Allyn & Bacon Series in Technical Communication. Thankfully, over the past months, I have observed his collaboration with *Technical Communication's* dedicated and distinguished Editorial Advisory Board as we worked to revise the journal's policies to promote more inclusive review policies and practices while maintaining a 30-day review process. I have also had the opportunity to see Dr. Dragga's graceful interactions with the conscientious authors, manuscript reviewers, and editorial staff as they worked together to prepare the excellent articles in this issue, which appear as follows:

Godwin Agboka, in "What is on the Traditional Herbal Medicine Label? Technical Communication and Patient Safety in Ghana," reports the findings of a study of documentation and labeling practices of non-prescription traditional herbal medicines (THMs) in Ghana, where regulation of THMs is limited. Agboka's findings present important implications for patient safety and calls for technical communication practitioners to use our knowledge of documentation and design to create accessible and educational documentation for consumers. Agboka also calls for more technical communication research exploring the global implications of THMs because "technical communicators add value by bridging the gap between the product and the end-user."

In "Minimalism Heuristics Revisited: Developing a Practical Review Tool" by Jenni Virtaluoto, Tytti Suojanen, and Suvi Isohella, the authors reintroduce minimalism as an approach to documentation and provide technical communicators with revised minimalist heuristics to be used in evaluating documentation quality and effectiveness. The article is rich with tools for research and practice in its examination of the history of minimalism in technical communication, obstacles to this approach, the Minimalist Documentation Process, a pilot study within an international company, and a set of revised minimalist heuristics.

In "Cultural Differences and the Structure of User Instructions: Effects of Chinese and Western Structuring Principles on Chinese and Western Users," by Qian Li, Menno D.T. de Jong, and Joyce Karreman, the authors present important findings regarding how Chinese and Western manual structures affect Chinese and Western users. This study, which examined participants' task performance, user satisfaction, and information selection, gives us insight into how Chinese and Western users differ in their use of manuals and when cultural adaptations are most important in the design of manuals for these audiences.

In Christopher Brett Jaeger, Joshua Little, and Daniel T. Levin's article, "The Prevalence and Utility of Formal Features in Screen-Capture Tutorial Videos," the authors present screen capture videos as a "distinct genre of communication" and catalog the formal features into four categories (attention cues, segmentation cues, content features, and vocal performance) for scholars and practitioners interested in evaluating the effectiveness of the features. The results of the study suggest that use of some formal features have important implications for video viewership.

Finally, in "Using Schema for Analyzing Audiences: Complexity and Simplicity Balance," Eric Sentell explains how schema are used to predict, notice, encode, recall, and use important information. Sentell proposes collective (self)schema, a flexible heuristic for audience analysis that builds on previous research on memory and audience. The author states using (self)schema can "create a bridge between the familiar and unfamiliar."

On the Cover

Communicating
Public Health
and Safety
in a Crisis

ARTISTS' NOTES

The recent pandemic has drastically changed our routines, habits, and above all, the way we communicate. In a society that is more connected than ever before, we struggle to efficiently adapt to and overcome the challenges brought by this health crisis. Among the sea of information that floods both our devices and our consciousness, the simplest and most efficient message, besides social distancing, is to wear a mask. It protects you and others around you to an extended degree. It also communicates that you care and that you are doing your part. The multitude of masks of different shapes, sizes, and colors is a testament to an old common knowledge regarding human beings: no matter what our individuality looks like, we are stronger when we come together. Communicating public health and safety in a crisis can look like a lot of things, but at its essence, it can be best illustrated by our sense of collectiveness and community. That is how we got through difficult times in the past, and that is how we will do it again.

ABOUT THE ARTIST

Marconi Douetts is an undergraduate student at Kennesaw State University, where he studies interactive design. This Bachelor of Science degree provides students with the skills needed to serve as interaction designers and user interface designers. Marconi is passionate about visual communication and the study of human behavior. He is available at amarconi@students.kennesaw.edu.

Honorable Mention

IN THIS TOGETHER

ARTISTS' NOTES

During the year of 2020, we witnessed how everyone plays a role in public health. I wanted to do my part and create an illustration promoting public health during this crisis. I also wanted to give thanks to the workers such as nurses, doctors, and researchers. They are doing a massive amount of work to save lives and get the community out of this terrible situation. I ultimately wanted to remind the audience that we are currently in a pandemic, and that everyone has a responsibility in this crisis.

ABOUT THE ARTIST

Kenric Kalpen is studying interactive design as an undergraduate student in the College of Humanities and Social Sciences at Kennesaw State University. This Bachelor of Science degree involves learning technical, theoretical, and problem-solving skills. These concepts are important to be a successful interactive and user interface designer. Kenric enjoys exploring interesting new topics that benefit his creativity. He is available at kkalpen@students.kennesaw.edu.

What is on the Traditional Herbal Medicine Label? Technical Communication and Patient Safety in Ghana

By Godwin Y. Agboka

ABSTRACT

Purpose: With a focus on patient safety in the marketing and use of non-prescription traditional herbal medicines (THMs), this article reports the findings of an analysis of documentation practices associated with 15 sampled THMs (nine labeled and six unlabeled) selected from stores, pharmaceutical shops, buses, traditional clinics, and streets of Ghana. The article is based on the fundamental assumption that THMs, much like conventional drugs, have side effects or toxic components, and therefore require effective documentation to alert users.

Method: The article employs the purposive sampling strategy of critical case sampling to analyze the 15 THM samples. This approach allowed me to select information-rich cases. These cases shed light on the challenges of labeling THMs and how those challenges impact patient safety. Using these cases, I made logical generalizations based on the outcomes of the analysis of the data.

Results: My observations revealed that some manufacturers made few attempts to provide information about the importance of pre-existing medical conditions, contraindications, period of use, who to contact or how to respond in case of overdose or adverse reactions, detailed dosage instructions, side effects, and potential drug interactions.

Conclusion: Although medical and health communication is a growing area in the field of technical communication, the specific topic of patient safety as it relates to THM documentation remains underexplored. Moreover, the relationship between patient safety and THMs is an important aspect of the healthcare needs for many people, and therefore deserves more attention.

Keywords: patient safety, developing nations, documentation, traditional herbal medicine, user advocacy

Practitioner's Takeaway:

- Documentation issues surrounding non-conventional pharmaceutical products, such as THMs, intersect with technical communication in the areas of information accessibility, health communication, and document design.
- Not only must documentation designers of herbal medicine provide labels, but they must also facilitate learning and action by users.
- Effective container labels, package inserts, and high-quality oral communication and counseling from trained vendors can go a long way to address patient safety issues.
- THM users will have better value for their investment in THM products if technical communicators design documentation.
- Because different cultures have unique requirements, more research is necessary to replicate the present results and determine culture-specific guidelines for THM labeling.

INTRODUCTION

A growing number of patients are taking control of their healthcare needs and have increasingly embraced alternative medicine as a route to disease prevention and treatment. Although conventional approaches remain popular, alternative medicine provides "an important healthcare service whether people have physical or financial access to allopathic medicine" (Wachtel-Galor & Benzie, 2011, p. 1). A typical trend is the growing reliance on and use of traditional herbal medicines (THMs) in primary healthcare decisions. However, an often underreported or overlooked component of the utilization of THMs is patient safety as it relates to labeling and documentation practices. Historically, THMs have been a specialty of the informal economy and the work of mostly traditional medicine practitioners whose instructions are communicated orally—so the issue of formal, printed labels has been a recent phenomenon as THMs become increasingly formalized. More so, the question of effective and user-centered product documentation associated with THMs has not been explored.

Ultimately, very limited published, scholarly research has documented the labeling issues associated with THMs and their related adverse events (see Boadu & Asase, 2017). I found no scholarship in the field of technical communication that addresses THM documentation. This is surprising because technical communication is a cross-disciplinary field that overlaps with instructional design, health communication, information accessibility, and usability. Developing targeted information products for users has long been the core of technical communication work (Lauer & Brumberger, 2016). In fact, with their longstanding user advocacy role, technical communicators have a more nuanced knowledge and appreciation of the communication, cultural, and design issues that inform effective documentation (Johnson et al., 2007; Potts, 2014), and therefore should be at the front line of effective access to and use of THMs—an important healthcare resource for users. More specifically, in organizational contexts, technical communicators add value to product design and documentation by improving productivity, increasing user satisfaction, and providing quality at a cheaper cost (I return to this argument fully later in this article).

With a focus on patient safety in the marketing and use of non-prescription THMs and also using the purposive sampling strategy of critical case sampling, this article reports the findings of an analysis of documentation practices associated with 15 THMs drawn from stores, pharmacies, buses, traditional clinics, and streets of post-colonial Ghana. This article is based on the fundamental assumption that THMs, much like conventional drugs, have components that create adverse side effects, including toxicity (Canter & Ernest, 2004; Gouws, 2018), and therefore require effective documentation regarding their administration. In Ghana, for example, although the Ghanaian Food and Drugs Administration (FDA) publishes laws and regulations requiring labeling of medicinal products (see Figures 1 and 2), manufacturers circumvent these processes and market products with no or poor documentation. Two observations become evident from the analysis: (i) lack of or ineffective labeling of THM containers based on users' and vendors' assumption that THMs are "natural and safe"; and (ii) the need for effective technical communication in THM labeling practices, particularly in the contexts of developing countries.

The study has some limitations. First, interviews with patrons of THM vendors would have added rich perspectives to the study, but time constraints made this impossible. Moreover, the sample size was small; nonetheless, it still provides important preliminary insights into some of the broad challenges associated with the marketing and use of THMs and also points technical communicators to future areas of research.

Product Documentation and Patient Safety

Effective documentation accompanying medicinal products and patient safety have clear connections to product usability and health. Thus, providing accessible and functional communication about a product enables users to make smart and important decisions about their health. For many patients, medicine documentation is one of the most important, if not the only, instructional document they will have to effectively administer their medicines.

Essentially, poor documentation, or lack thereof, may impact patient health and safety.

Documentation is a descriptive extension of a product that can transform a user's experience in positive or negative ways (Hogan, 2013, p. 156),

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depending on the developer's efforts and understanding of the product, audience, and the context of use. It involves information products that accompany technology, software, and scientific products that users access for their activities. It may include all the marketing materials and all documentation that is produced during the research and development stage in addition to the support materials that are made available upon purchase of that product (Ahlberg, 2017, p. 8). Although it is not a primary product purchased by users, as a secondary product, documentation provides essential support for primary products (Smart, et al., 1996, p. 157). For example, documentation could point users to: (i) product features and instructions for using the product in the most appropriate way, (ii) useful information about the safety issues associated with the use of the product, and (iii) target audiences and how the documentation delivers information to those audiences. Effective documentation transmits information and also articulates the usability processes with all their potential benefits and risks (Slack, 2003, p. 1). The goal of documenting product information is to "honestly and clearly inform…users of all safety precautions and the extent to which they should be considered" (Klebanov, 2009, p. 6).

In many ways, documentation enables or empowers users. Consequently, it must be accurate, culturally appropriate, informative, and clear, because omissions may lead to serious consequences (Hogan, 2013). As Klebanov (2009) argues, although documentation may not be vital to the use of a product in every case and for all users, "proper documentation can mean the difference between life and death" (p. 6). For example, the often-cited Challenger Disaster case used in many technical communication classes is a typical case of information failure, ineffective documentation, or misunderstanding between developers and end-users, which resulted in the death of seven crew members. The precise delivery mode of information products varies for every product, but it should succeed in helping the user meet the specific expectations for the product, without injuring the user.

Ultimately, documentation has the potential to impact patient safety. In the specific context of this article, documentation practices associated with herbal medicines—in fact, any pharmaceutical products—are an important measure of patient safety. For example, a 2006 report released by the Institute of Medicine (IOM) suggests that problems with labeling were cited as the most common cause of outpatient medication errors and adverse drug effects (as cited in Veronin, 2011, p. 10). Poor labeling practices have also been cited as one of the leading causes of medication-related mortality globally (Jeetu & Girish, 2010), making quality control of product labels take on greater importance. I should note that patient safety used here encompasses the actions and processes which healthcare systems and organizations take to protect their patients from errors, accidents, infections, and injuries. It includes effective management and administration of medical resources in ways that safeguard the health of patients.

The Global Rise of THMs

THMs encompass "practices, approaches, knowledge and beliefs not based on scientific evidence that are applied to treat, diagnose and prevent illness within a society" (Moreira et al., 2014, p. 248). They are inextricably linked to indigenous cultural practices that reflect the historical, environmental, political, and economic conditions of indigenous people. THMs are "the most economical and available system of healthcare for a large number of [people] in rural and semi-rural areas" (Kamsu-Foguem & Foguem, 2014, p. 127). Not only are they the only option for healthcare or the most accessible option, but they have also become the preferred option (Twumasi, 2005). Studies report that THMs remain the foundation of about 25% of all synthetic drugs prescribed globally (Sahoo et al., 2010; Okigbo & Mmeka, 2006)—many of which are used in the treatment of heart disease, blood pressure regulation, pain, and asthma. They are taken and used in different formats: whole herbs, teas, syrup, essential oils, salves, rubs, capsules, and tablets (Wachtel-Galor & Benzie, 2011), and they are used in the prevention and treatment of multiple health conditions, including weight loss, health promotion, and therapy for chronic conditions. The primary reasons for their use are affordability, access, alignment with cultural beliefs, and assumptions about safety. However, while many benefits can be derived, research points to many negative outcomes as well (Gouws, 2018). The

foundational argument motivating the use of THMs is the perception that they are "natural and safe" and therefore not toxic; however, this is inaccurate (Canter & Ernest, 2004). To quote Kamsu-Foguem & Foguem (2014), "Any substance with a healing influence can also generate unwanted or adverse side-effects . . . [that] . . . carry with them specific risk factors which can lead to increased vulnerability to human health difficulties" (p. 127). THMs reportedly have as many side effects or as much toxicity as biomedical drugs used in conventional contexts and may cause significant adverse events. For example, research published by the American Association of Poison Control Centers (AAPCC) based on 26 years of data (i.e., 1983–2009) and a reported 2 million plant ingestion exposures, suggests that only 18.5% of THMs were categorized as nontoxic (Carmona & Peirera, 2013). Moreover, the actual dosage and composition of THMs are mostly shrouded in secrecy, raising potential patient safety issues.

In the following sections, I share information about the context of the research, methods employed, samples used for the analysis, and results. I also discuss the implications of the findings, and ultimately make the case that because of their direct link to safety, technical communicators are better placed to design medicinal documentation.

RESEARCH STUDY PRESENTATION

Context of the Research: Ghana

Ghana is a post-colonial democracy inhabited by people of African descent. The official language of trade and education in Ghana is English (Owu-Ewie, 2006, p. 76), even though it has about 72 "living languages" (Zorc , 2003, p. 7). According to UNESCO's Institute for Statistics (2018), the literacy rate in Ghana is 79%, although the breakdown in terms of age division tells a more nuanced story for the purposes of this study: 15–24 years (92.5), 15 years and above (79%), and 65 years and older (50.9%). As of 2017, 16.2% of the population had a college education, and national policy mandates that all communication that supports product manufactured in Ghana or abroad should be in English. Ghana's economy itself is heavily dominated by the informal sector, which is made up of self-employed people such as manufacturers of local products, farmers, traders, food processors, artisans, and craft-workers who

have limited structure or coordination. Much of this sector is greatly influenced by tradition.

THMs fall in this informal, traditional sector, and are a primary healthcare option for many Ghanaians of diverse educational, religious, socio-cultural, gender, age, and ethnic groups. They are a culturally acceptable healthcare option that has become universal in all parts of the country. Between 70% and 75% of the population depend on THMs for their primary healthcare, and THMs are also the primary form of treatment for more than 60% of children with high fever resulting from malaria (WHO, 2003a). THMs have often been used in the treatment of malaria, infertility, boils, asthma, hypertension, diabetes, stroke, cancer, and minor injuries (Darko, 2009). In some rural areas, they are the only available healthcare or the most preferred treatment options. Even in urban centers such as Accra, the capital, the sale and use of THMs have surged over the years (Darko, 2009); THMs are sold on the streets and in buses, pharmacies, stores, and traditional medicine clinics.

Their popularity is evident in their integration into mainstream healthcare. In 2012, the government of Ghana established the Traditional Medicine Practice Council (TMPC), after which THM practice was formally integrated into the main healthcare delivery system. In the past, the use of THMs was the preserve of unlicensed traditional practitioners; these practitioners claimed knowledge of the practice that was passed down from ancestors; however, presently trained THM practitioners are now licensed by the Kwame Nkrumah University of Science and Technology (KNUST), the Centre for Research into Plant Medicine, and the Tetteh Quarshie Memorial Hospital to consult and prescribe THMs for clients in both government and private hospitals (Agyei-Baffour et al., 2017).

Unfortunately, the regulation of THMs remains a major problem in Ghana. The Ghanaian Food and Drugs Authority (FDA) is the regulating body, but it has been unsuccessful in registering all THM healthcare centers or their products. Some manufacturing firms have circumvented the approval processes and managed to market their products, often making claims that may not be supported with evidence. Ghana's Public Health Act, 2012 (ACT 851) section 118, mandates the Ghanaian FDA to regulate medicinal products by ensuring adequate and effective standards for products.

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Manufacturers who plan to market and prescribe medicinal products must satisfy requirements related to product content and labeling (see Figure 1).

In many cases, products go through the approval process, and then some are adulterated after registration. As a result, during post-surveillance activities by the Ghanaian FDA, some products have been recalled or banned from the market. At a stakeholders' meeting in 2017, for example, the Chief Executive Officer of the Ghanaian FDA noted that no THM in the country had been able to go through the Ghanaian FDA clinical trial required to ascertain

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3.2 SPECIFIC REQUIREMENTS

a. The presentation of the product shall not have any resemblance in spelling and pronunciation of name, or packaging to another product, that has been previously registered by the Authority.

b. All samples submitted should conform to existing labeling regulations as specified in the Authority's guidelines for product labeling.

c. Scientific and/or botanical names of the plants used, as well as the parts of plants used and the quantity of active ingredients used in the preparation, shall be submitted.

d. The list of all excipients used and their quantities per dosage units used in the preparation shall be submitted.

e. The indications for which the herbal medicinal product is being presented for registration shall be unambiguously stated.

f. All documentation submitted shall be in English, and must be legibly printed and not handwritten.

g. Four (4) copies of the labels and leaflet inserts, conforming to existing labeling regulations in Ghana shall be included in the documentation.

h. If the product is produced on contract manufacture, evidence of the contract agreement shall be produced in the documentation submitted.

Figure 1. Requirements for registration of medicinal products in Ghana (see https://fdaghana.gov.gh/index.php/operational-forms-2/)

the efficacy of herbal preparation for the treatment of chronic diseases in the last five years (Kale-Dery, 2017, para. 1). Issues such as this have implications for the practice of technical communication. As professionals who are at the frontline of advocating for users and enhancing access to complex data, health services, and new discoveries, technical communicators have important roles to play in facilitating users' access to quality design and information.

The Ghanaian FDA's Labelling Guidelines

For the purposes of this study, the labeling of THMs is the primary concern. Legally, the Ghanaian FDA mandates that all THM products meet labeling requirements (see Figure 2) that are in agreement with the general guidelines published by the World Health Organization.

Labeling is a complex art that involves thoughtful investment of economic and human resources to facilitate quality and safety. Best practices in labeling require the dedication of sometimes entire technical communication departments or teams focused on the design, communication, and management of information either printed on or included in products. In Ghana, however, most pharmaceutical and manufacturing companies do not have technical communication departments, so the labeling of medicinal products is mainly left to untrained personnel who have to communicate the complex processes involved in the administration of medicines. They may decide what goes into labels and what forms labels should take; ultimately, the quality control and value to the user are compromised. Needless to say, poor labeling and packaging practices are major concerns (Vickers et al., 2006). Considering these patient safety issues, the present study sought to analyze some labels that accompany THMs sold across pharmacies, stores, buses, streets, and traditional healthcare centers in Ghana. The purpose was to ascertain how the labels met the Ghanaian FDA labeling requirements and address patient safety concerns.

METHODS

Design

Motivated by an exploratory qualitative data collection approach, I employed the purposive sampling strategy of critical case sampling to allow me to select

information-rich cases (Patton, 1990, p. 169) whose study and analysis shed light on the challenges of labeling THMs and how the challenges intersect with patient safety. I also hoped that this approach would inform me about critical cases and therefore provide grounds for making "logical generalizations" (Patton, 1990, p. 175) based on the analysis of the data. To be sure, critical case sampling, a type of purposive sampling, involves selecting a limited number of critical cases that have the potential to generate "the most information and have the greatest impact on the development of knowledge" (Patton, 2015, p. 276). On the basis of this approach, I focused on four main factors that allowed me to generate the most important cases:

- Site
- Most commonly sold or used THMs

REQUIREMENTS

3.1   General Requirements

3.1.1   Labelling shall be informative and accurate.

3.1.2   Product labels shall be printed. The print shall be in a clear font and legible. The print shall be indelible and not fade when exposed to sunlight.

3.1.3   The information on a label shall include, but not be limited to, the following:

(a) The name of the product, and the generic or INN/INCI[1]

(b) A list of the active ingredients using INN/INCI or IUPAC[2] system, where applicable, showing the amount of each present in a dosage unit.

(c) The net content of the container

(d) The batch number

(e) Date of manufacture and best before/expiry date

(f) Directions for use, and any warnings or precautions that may be necessary

(g) Any special storage conditions or handling precautions that may be necessary

(h) Indications, frequency, route and conditions of use where applicable

(i) The names of any non-medicinal ingredient known to be a safety concern

(j) Name, postal address and premises address of the manufacturer and Distributor

(k) Country of origin.

3.1.4   The product name, package or label shall not bear close resemblance to a previously Registered product.

3.1.5   If the original label is in a local or foreign language, the product information shall be in English or a translation thereof.

3.1.6   All products that are not recommended for use in or by children, the statement "not to be taken/used by children" shall be included

3.1.7   All products shall bear the statement "keep out of the reach of children"

3.1.8   Products meant for external use shall bear the statement "for external use only"

3.1.9   In addition, the name of product shall not be offensive, unethical, socially or traditionally unacceptable, superstitious, magical etc.

3.1.10 All dosages should be stated in words.

3.1.11 For products meant for children, the age ranges shall be specified for each dosage regimen.

3.1.12 The list of indications shall correspond to the known activity of active ingredients declared.

3.1.13 Product locally manufactured shall bear FDA registration number

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[1] INN/INCI refers to the International Nonproprietary Names system (https://www.who.int/medicines/services/inn/en/), which provides health professionals with a unique and universally system to identify each pharmaceutical substance.

[2] IUPAC refers to the International Union of Pure and Applied Chemistry

**Figure 2. Ghanaian FDA requirements for labeling products
(See https://fdaghana.gov.gh/images/stories/pdfs/downloads/drugs%20guidelines/LABELLING%20REQUIREMENTS.pdf)**

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- Most typical illnesses targeted for potential treatment by the THMs
- Locales where the THMs were commonly sold

My decision on these factors was influenced by my knowledge of the THMs marketplace in Ghana, particularly in the specific terms of the more likely categories of the most commonly used THMs. In addition, I conducted extensive observations of the marketing and purchasing culture of the locale. Ultimately, I focused on Tema, Ghana, which is a major hub for THMs, and a place where traditional herbal clinics and manufacturing companies abound. Then, based on my knowledge of the marketing culture, as influenced by media discussions and my own personal observations, I learned that THMs were typically sold at pharmaceutical shops, stores, public transit systems (e.g., buses), streets, and traditional healthcare centers. All these points of sale were fairly close together, although they were not necessarily in the same neighborhood. However, the marketing locales represented varying types and quantities of THM products and business. I learned that the most commonly sold or used THMs also represented the

ailments most commonly treated by the THMs (e.g., malaria, piles, hypertension, menstrual pain, joint pain, body pain, diabetes).

I obtained 15 THM samples for this study by visiting the four typical marketing locations with the goal of purchasing the most commonly used THMs within the locale. Of the 15 THMs, and entirely by chance, six were unlabeled and nine were labeled. I obtained four of the 15 from a popular and registered traditional clinic, two from a bus heading from Tema to Accra, four from a THM store, two from the streets, and three from a pharmaceutical shop that also sold conventional medicine. I did not examine the samples while at each of these purchasing locations. Figure 3 shows a typical label.

The medicines treated the following conditions: malaria, menstrual pain, piles (hemorrhoids), constipation, body pain, rheumatic pain, loss of appetite, genitourinary problems, inflammatory disorders, and fever. Table 1 summarizes the uses of the sampled products and their active ingredients based on the product label. I gathered information about the active ingredients and the indications for the six unlabeled samples from the marketers at the point of sale.
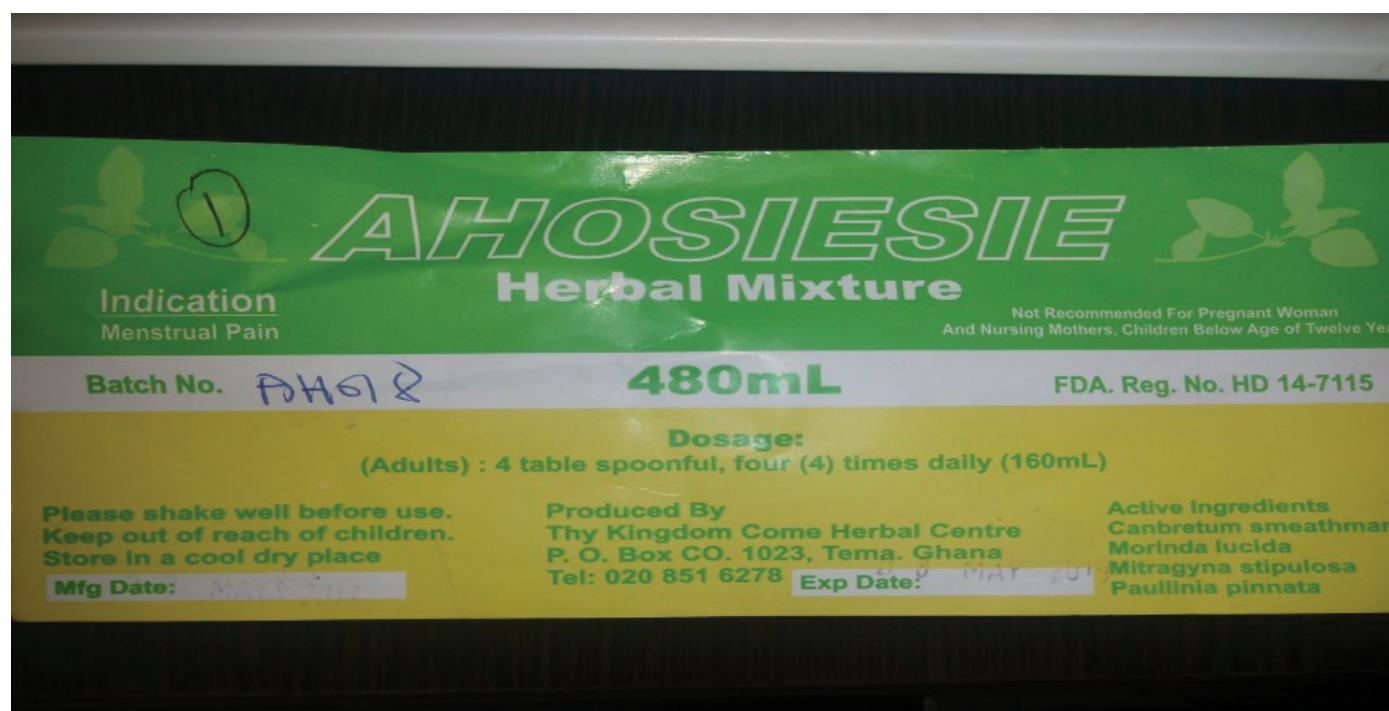
Figure 3. Sample label used to support the treatment of menstrual pain with a THM

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Data Analysis

I analyzed the textual information that accompanied each sample by means of qualitative content analysis, which is a "primary messaging-centered methodology" (Neuendorf, 2002, p. 9). The primary motivation for this approach was to allow themes to emerge from the data. For the purposes of this study, qualitative content analysis was a flexible method for analyzing the primarily textual data and also for "distilling words and other lexical items into fewer concentrated categories"

Table 1. Uses of the sampled THMs and their active ingredients

Samples	Active ingredients	Treatment/indications
Sample 1	*Canbretum smeathmanni* *Morinda lucida* *Mitragyna stipulosa* *Paullinia pinnata*	Menstrual Pain
Sample 2	*Anthraquinones* *Mitragyna stipulosa*	Piles, menstrual pain, constipation
Sample 3	*Triclisia dictyophylla* *Tiliacora trichantha* *Melia azedarach* *Cryptolepis sanguinolenta*	Malaria
Sample 4	*Alstonia boonei* *Capparis erythrocarpus* *Terminalia ivorensis*	Rheumatic pain, body pain
Sample 5	*Hypericum perforatum* *Symphytum officinale*	Joint and muscular pain
Sample 6	*Tetrapleura tetraptera* *Cimum viride*	Malaria, general body pain, loss of appetite
Sample 7	*Aloe schweinfurthii* Thonningii *(Ficus thonningii)*	Fever
Sample 8	*Alchornea condifolia* *Sida acuta* *Eleusine indica*	Genitourinary problems and inflammatory infections, including gonorrhea, syphilis, and candidiasis
Sample 9	Cardiac glycosides Cyanogenic glycosides	Hypertension
Sample 10 (unlabeled)	Phenols	Hernia
Sample 11 (unlabeled)	Tannins *Scoparia dulcis*	Diabetes
Sample 12 (unlabeled)	Anthraquinones Glucosinolates	Piles, constipation, menstrual pains, rheumatism, hypertension, general body pain
Sample 13 (unlabeled)	*Anthraquinones*	Constipation
Sample 14 (unlabeled)	*Artemisinin* *Melia azedarach*	Malaria, typhoid, jaundice, fever, nausea
Sample 15 (unlabeled)	Ginsenosides	Infertility

(Cavanaugh, 1997, p. 5). Essentially, each label was a unit of analysis, so I analyzed the textual components of each label individually and noted specific observations, themes, and categories based on the notion of what communication issues were likely to pose the most challenges for patient safety, especially in terms of access and use, and also based on the minimum requirements provided by the Ghanaian FDA.

FINDINGS

The major findings of the analysis include the following based on information generated from the 15 samples selected from the specific locale of Tema (Table 2):

- Of the 15 samples, six samples (10–15; see Table 4) had no labels on the container, neither did they have any inserts in the product boxes.
- Only two of the nine labeled samples included inserts to augment the information provided on the container labels.
- Only two of the nine labeled samples included the statement, "side effects."
- None of the nine labeled samples included any actual information about potential side effects, incorrectly suggesting that none of the samples included any toxic elements or had the potential to interact with other drugs to cause adverse events.
- All nine labeled samples included information about batch number, Ghanaian FDA registration, manufacturer and distributor address, labels in English, active ingredients, usage indications, storage conditions, and expiration dates.
- Eight of the labeled samples included a precautionary statement such as "not recommended [for] pregnant women, lactating mothers, and children under twelve (12) years."
- Seven of the nine labeled samples included a statement about children such as "not to be taken/used by children" or "keep out of the reach of children."
- Seven of the nine labeled samples included information about dosage instructions.
- Only two of the nine labeled samples (samples 6 and 7) met most of the requirements spelled out in the Ghanaian FDA guidelines. In addition to labels on the product container, samples 6 and 7 included inserts that provided details such as a product warning, drug interactions, contraindications,

overdose symptoms and treatment, and mode of administration—although both samples stated that the medicines had no side effects.

DISCUSSION

Deficiencies in THM Labeling

The analysis of the samples suggests that as a result of the inadequate or missing technical communication provided by the manufacturers and marketers of THMs, there are serious safety concerns. I found few or no attempts from the manufacturers and the vendors to provide information about pre-existing medical conditions, contraindications, periods of use, who to contact or how to respond in the case of an overdose or complications, detailed dosage instructions, side effects, and potential drug interactions. For example, it appears that many of the labeled samples were simply concerned with superficial features such as batch numbers and registration numbers that are associated with the labels. In some cases, the labels met the barest minimum of the requirements of the Ghanaian FDA. This suggests the priority was to meet the Ghanaian FDA requirements rather than to address the health needs of users. One can argue that from communication and patient safety perspectives, the Ghanaian FDA's requirements did not go far enough. Nowhere do these requirements emphasize quality of communication; on the contrary, the statement in the Ghanaian FDA guidelines (see Figure 2) that "Labelling shall be informative and accurate" is vague. Is the term "informative" supposed to mean the quality of the English or the level of detail? Thus, one improvement would be to replace the current text with a detailed description of the required content, such as "contains details on contraindications, drug interactions, uses to be avoided." Essentially, asking for labels to be printed in English only without insisting on the quality of the English or quality of communication is an invitation to manufacturers and marketers to compose documents without considering their effects on users.

The findings also reveal that six of the 15 samples did not include any labels. This is an important omission, since many of the illnesses the THMs treat are chronic and life-threatening conditions that require careful and thoughtful administration of medicine and subsequent management. Of course, in a culture where most instructions about medicinal products are

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given by word of mouth, it can be assumed that a lot of the instructions associated with THMs are given at the point of sale. My own research in the study locale confirmed this. When I purchased the samples, I received only cursory instructions at the point of sale. Research has, however, pointed out that oral instructions are easily forgotten and misunderstood (Davis et al., 2006). This is a cause for concern because patients may overdose on or wrongly administer medicines.

Another finding is that only two of the nine labeled samples contained a statement about side effects. Even more worrying is the failure of any sample to actually list any side effects. Yet, the active ingredients listed on the medications suggest potential toxic elements which may have biological effects or which may interact with other drugs to produce harmful effects on the human body. For example, sample 3 used in the treatment of

malaria lists *cryptolepis* as an active ingredient; *cryptolepis* has potential genotoxicity, which could alter the biological functioning of the body. Similarly, phenols, listed as an active ingredient for sample 10, which is used for the treatment of hernias, may have an irritant effect if applied externally instead of internally. These examples illustrate that even when active ingredients may be considered natural, all substances have the potential for misuse and overdose, and are therefore potentially harmful. Of course, there is also a concern about potential interactions with other drugs. In addition, as Nasril and Shirzad (2013) argue, if a drug is effective, it will have side effects, and the fact that none of the samples highlighted this important concept is surprising. Manufacturers cannot trust patients to make the right choices if they fail to provide proper guidance that will assist patient in administering their medicines.

Table 2. Characteristics of the labels of the samples and list of samples that met the Ghanaian FDA's labeling requirements. Sample numbers refer to samples in Table 1.

FDA Requirements	List of samples that met requirement
Existence of some label?	1-9
Statement of side-effects?	6, 7
List of side-effects?	None
Batch number?	1-9
Date of manufacture and expiration date?	1-9
Statement about storage conditions?	1-9
Directions for use?	1-4, 6-9
Precaution statement: "not recommended for pregnant women, lactating mothers, and children under twelve (12) years."	1-4, 6-9
Contraindications?	1-9
List of active ingredients?	1-9
Label in English	1-9
Manufacturer and distributor address?	1-9
Statement about children: "not to be taken/used by children"; keep out of the reach of children"	1-3, 6-9
Dosage in words?	1-9
FDA registration number?	1-9
Clear dosage application?	6, 7

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Furthermore, although eight of the nine labeled samples included some material about dosage instructions, information on many of the labels may be confusing. For example, the instructions for sample 3 asks users to take "4 table spoonful, four (4) times daily (160mL)." However, this does not answer the question of how many hours should come between doses, whether the dose should be before or after meals, or frequency. Based on best practices (Davies et al., 2009; Wolf, 2006), a clearer version of this advice would be the following: "At 8 a.m., take 1 tablespoonful (40ml) after eating; at 1 p.m. take another tablespoonful (40ml) after eating; at 6 p.m. take another tablespoonful (40ml) after eating; and at 11 p.m. take another tablespoonful (40ml) after eating. Do not exceed four doses in a day."

Technical Communicators as Designers of Medicinal Labels

As I argued earlier in this article, creating accessible product documentation is vital for the effective use of every product. To borrow the words of Dwain Simpson (1987), the three most important components to success in information accessibility are "Documentation, Documentation, and Documentation" (p. 34), but ineffective documentation can also render users incapable of using a product. Of course, as designers themselves (Sun, 2006), users may come up with their own creative ways of using a product, but this may come with harmful consequences. Ultimately, documentation should not only be a primary consideration in medicinal product development, but it should also be carefully planned to assist users to navigate the product as easily and as effortlessly as possible so that users can make informed choices about their health. More than three decades ago, Redish (1989) argued that readers of product documentation "read to do" and "read to learn" (p. 289). They "extract information for immediate action" and "absorb information for future recall" (Reddish, 1989, p. 289). The findings from my study show, however, that even the nine labeled samples provided few opportunities for users to safely act on the information they were provided on the labels. The labels should have enabled users to understand the consequences of the choices they were making by purchasing and using the products: how the choices will affect their health and how that compares to the desired

outcome. Needless to say, the documentation provided on many of the labels was inadequate and thus appeared likely to be ineffective in meeting the health needs of users; thus, they cannot ensure patient safety.

To be fair, THMs are too complex to be fully described using only a few words on the side of a container, but because failure in communication has the potential to negatively impact the health of patients, as the findings suggest, it is important that manufacturers employ best practices to make medicinal information easily accessible to users. This is particularly true since most THMs have not undergone clinical trials that would reveal side effects and potential drug interactions. Effective container labels, package inserts, and quality oral communication and counseling from trained THM vendors can go a long way toward addressing these gaps. Medicinal plants contain too many different compounds for manufacturers to not document the risk factors associated with the plants and side effects. Vulnerable users, including those with low literacy, elderly patients, and those who live in rural areas, require even more thoughtful attention to the design of labels to communicate effectively. In essence, the use of clear labeling instructions would improve patient understanding. Effective labels facilitate communication with and comprehension by patients, and help them to more accurately access their medications. Admittedly, the problems associated with THM labels may be a function of poor regulatory standards, poor enforcement of these standards, or the misplaced attitudes of manufacturers/marketers towards design, but they are also clearly a problem of poor technical communication and documentation. In Ghana, many manufacturers create THM documentation without using the services of trained communicators, because they do not find the need to do so. Technical communication is not developed as a profession in Ghana so many organizations rely on the services of untrained, in-house personnel or English graduates from universities or journalism schools who are not professional technical communicators to produce their documentation. Some manufacturers believe in the "anyone can write" mantra, and documentation is not seen as a crucial part of product development, as is evident in the study results. Of course, in the rural parts of Ghana, the communication of the use of medicinal products is predominantly by word of mouth, but it is

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not the case in more urban areas, such as Tema, which have a greater population of educated people.

In any case, because of the health ramifications of poor technical communication in the THM industry in Ghana, it is important that manufacturers and marketers of THMs add trained technical communicators to their teams because of the value technical communicators add to information design and accessibility. Investigating how users interact with information products, and using that understanding to improve the design of those products is a central mandate of technical communication (Lauer & Brumberger, 2016, p. 249). Technical communicators have a long history of collaboration with fields such as engineering, technology, and medicine, and therefore are well-versed in crafting and developing information for these specialized fields that better address the needs of target audiences.

Take, for example, scientists who create new products; they may have the requisite knowledge to define and discuss the methods for using and applying the products, but they may not understand the language the end-user needs to access the products. Being subject matter experts, scientists already speak the language of their products, and therefore may assume that their audiences know what they know. However, with a more intuitive understanding of audiences and rhetoric, technical communicators add value by bridging the gap between the product and the end-user. They conduct research grounded in user analysis to gather the requisite information that will inform information design and accessibility. By their training, technical communicators work closely with subject-matter experts and/or become knowledgeable enough about products to communicate information about the product to users. More importantly for organizations, technical communicators generate "greater return on investment" (Redish, 1995, p. 26) by enhancing user satisfaction and reducing the cost of writing and design without sacrificing quality.

As Slaughter (2009) notes, all organizations share a basic goal: "ensure customer satisfaction at the lowest risk (for the customer and the organization) while earning a profit (or, at least, not losing money)" (p. 13). Certainly, many organizations understand the importance of technical communication, but it is easy for some manufacturers of THMs to see documentation as an unnecessary overhead especially in a context

which relies so heavily on oral communication in giving medicine instructions, or which doesn't hold manufacturers accountable for ineffective or omitted documentation. Technical communicators must, therefore, make the "value-added" case to the manufacturers of THMs.

In her seminal article, "Adding Value as a Professional Technical Communicator," Redish (1995) explores the value of technical communicators in organizational contexts by highlighting how technical communicators "improve productivity" (p. 26), "increase benefits" (p. 27), and "reduce costs" (p. 27). Specific to the issue of cost, she argues that technical communicators add value in a number of ways: (i) reduce the cost of documentation without sacrificing quality, (ii) produce high-quality documentation by reducing post-market expenses and usability issues, and (iii) contribute to the overall improvement in an organization's return on investment (p. 30-31). In many ways, technical communicators take on a diversity of roles that extend beyond writing and design. They understand the value of audience-specific documentation while also justifying its value in economic terms.

Slaughter (2009) also identifies some of the more tangible ways technical communicators add value: (i) user advocacy through documentation design and usability testing, (ii) improved documentation for product support, (iii) support for marketing and sales, and (iv) affordability and quality (p. 13). Essentially, getting design and writing right could be less costly than a lack of or inefficient documentation design. Hiring a technical communicator to write product documentation could provide a number of benefits for both users and THM manufacturers. For example, technical communicators could help manufacturers avoid needless lawsuits, harm to users, and waste of time and resources while demonstrating the effect of poor design on product usability and on users' lives as well as the overall impact on an organization's reputation. These issues are all areas of expertise that technical communicators can bring to the context of a cost-benefit analysis.

Certainly, technical communicators offer both economic and non-economic benefits to organizations. They organize, simplify language, design, and convey complex processes in a patient-centered manner. They thoughtfully negotiate the flow of information from

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the viewpoint of the user (Slack, 2003), and they are the first and last lines of advocacy for the users. These are all important for the THM sector. Technical communicators are not just writers but content experts in information creation, management, and strategic thinking. They add value to product documentation by serving as important quality assurance product testers "whose role is to . . . work with the developers to eliminate flaws and bugs" (Mead, 1998, p. 362). As a result of their training and work with product development and subject matter experts, technical communicators "are a repository of knowledge in a company" (Mead, 1998, p. 363) and, therefore, "hold a position of communication power" (Smudde, 1993, p. 36). Essentially, they are at the front line of patient advocacy and safety, because they are the professionals to deliver the most accessible and tangible design and communication to users. Ultimately, the risks involved in leaving the labeling of THMs in the hands of untrained technical communicators may be far too great and too costly for users and manufacturers. Rather, both users and manufacturers will have better value for their investment in the THM products if technical communicators design the THM documentation. We thus need to focus on our role as content experts, not just as writers.

This study points to the inadequacy of clearly written information for THM products in Ghana. It also establishes that issues surrounding non-conventional pharmaceutical practices intersect with technical communication in the areas of information accessibility, health communication, information design, and document design, but manufacturers and vendors should not be trusted with the lives of users.

CONCLUSION

Although medical and health communication is a growing area in the field of technical communication, the specific area of patient safety remains underexplored. Moreover, the relationship between patient safety and THMs is an important aspect of the healthcare needs for many people, particularly those in the developing world. It therefore deserves more attention in the field of technical communication. Effective labeling and documentation practices are access and safety issues, because the availability of

well-designed health information in the form of labels and package inserts are essential for users to make informed decisions about their health. This is particularly true in the Ghanaian context, in which many users of THMs obtain these medicines without consulting a medical professional. It will be important for future research to highlight the experiences of users in their use of THMs in relation to the quality of the information they receive.

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Minimalism Heuristics Revisited: Developing a Practical Review Tool

By Jenni Virtaluoto, Tytti Suojanen, and Suvi Isohella

ABSTRACT

Purpose: This article looks at existing minimalism literature and the application of minimalism heuristics. It proposes a revised set of minimalism heuristics to be used at different phases of the minimalist documentation process. The goal is to offer a practical tool for technical communication professionals.

Method: The revised heuristics are a combination of a literature review, the best practices of technical communication, and a company pilot study where the heuristics were tested.

Results: The article offers a revised list of minimalism heuristics, to be used as part of the minimalist documentation process to ensure documentation quality.

Conclusion: The technical communication field is charting new ground in the era of responsive design and mobile platforms. In this new landscape, the principles of minimalism have much to offer. The proposed minimalism heuristics comprise one strategy of applying minimalism for better documentation quality.

KEYWORDS: minimalism, minimalism heuristics, minimalist documentation process, documentation quality

Practitioner's Takeaway:

- Minimalism has been one of the major trends in technical communication since the 1990s, but there is a lack of literature on real-life applications of the approach.
- Low-cost, flexible solutions are needed for ensuring the quality of documentation in the changing technical communication landscape.
- The revised set of minimalism heuristics, to be used as part of the minimalist documentation process, provides a flexible tool to evaluate documentation quality.

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INTRODUCTION

Minimalism has been one of the major trends in technical communication since the 1990s (Hackos, 2008; Lanier, 2018). It is a user-centered, contextual, and action-oriented concept for creating customer documentation (Carroll, 1990; van der Meij & Carroll, 1995; Dubinsky, 1999), making it well-suited to the general ethos of technical communication (e.g., Schriver, 1997) and information-development management (Hackos, 2007). Draper and Oatley (2000) find minimalism to be a well-grounded, thoroughly user-tested theory which can be applied "on the basis of little training other than reading one or two research papers" (p. 223). The benefits of minimalism seemed promising from the start: Minimalist manuals helped users make fewer mistakes, complete tasks faster, and explore the software with more independence (van der Meij, 1992, p. 15). It has also been suggested that minimalism could be applied to improve other kinds of professional communication (Manning, 1998).

Minimalism was the framework for a special training program we arranged for Finnish technical communicators in 2017–2018. The program—*Minimalism in Responsive Design*—was funded by the Finnish Ministry of Education and Culture, and it brought together 18 technical communication specialists and five Finnish universities. One of the aims of the training program was to combine theory and practice in the program contents. Minimalism as a theoretical and methodological concept was new to many of the participants although several had previously heard the term. It was clear from the beginning of the program that concrete, agile tools were needed to apply the principles of minimalism in practice in different company environments. In fact, there has been a call for a strategy to apply the principles of minimalism since the 1990s (Anson, 1998, p. 115). Today, this call is even more pressing, as the technical communication field is charting new ground in responsive design and mobile platforms, for example (Lanier, 2018, p. 83). This paper is one step towards developing such a strategy.

This article focuses on one methodological aspect of minimalism, namely minimalism heuristics, developed by van der Meij and Carroll (1995, 1998).

The heuristics, i.e., general principles, are based on solid empirical research, and are intended as a tool for developing documentation. However, much like minimalism as a whole, our experience is that the heuristics do not seem to be applied in everyday practice. We will revisit the heuristics and revise them by supplementing the heuristics with the best practices of technical communication. This seems like a rational combination, as both minimalism and the best practices contain similar suggestions and recommendations; although early minimalism was more restrictive than other user-centered approaches to documentation, nowadays, those differences are diluted and we can regard minimalism as one user-centered approach to good technical communication. In addition, we will link the heuristics into the minimalist documentation process (Virtaluoto et al., 2018), where, in the spirit of minimalism, the user's journey steers the entire process (van der Meij & Carroll, 1995). The aim is to offer a practical, low-cost tool for technical communication practitioners.

In this article, we place minimalism in the context of modern-day technical documentation and typical user instructions. This is a very different starting point from what Carroll (1990) had when he developed minimalism. At the time, software was new to many people and it rarely came with a getting-started manual or tutorial, so the focus was on getting users started and guiding them to explore a new tool. The situation today is very different, and, hence, in the article we will discuss the implications of this change for the minimalism heuristics.

We will first introduce the minimalist approach and the original minimalism heuristics. We will also discuss some of the reported obstacles to minimalism and conduct a brief literature review on minimalism. Then, we will present our model of the minimalist documentation process, including an explanation of the ways in which the different phases of the process are tied to minimalism heuristics (Virtaluoto et al., 2018). Finally, we will present the revised minimalism heuristics complemented with the best practices of technical communication and explain the use of heuristics as an evaluation tool through a company pilot study we conducted in 2018.

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MINIMALISM AS AN APPROACH TO DOCUMENTATION

Although the concept of minimalism is familiar to many technical communicators (see, e.g., Lanier, 2018), a closer look reveals that the idea of minimalism among professionals might be very different from the actual minimalist approach (see Carroll & van der Meij, 1996). "Minimalism" is also used in different ways in technical communication literature (Oatey & Cawood, 1997, pp. 265–266; see also Obendorf, 2009, for an extensive account of the concept), and it is often seen as simply a way to publish less documentation (Virtaluoto et al., 2016, p. 13). In the following we will review the essentials of minimalism.

The two pillars of minimalism are the use of a product and its user. It is use-centered, as its main goal is to support the usage of a product. It is also user-centered, because it takes into consideration the user as much as possible (e.g., van der Meij & Carroll, 1995; van der Meij, n. d.). It should be noted that at the time when minimalism was being developed in the 1980s, other researchers (e.g., Rosenbaum, Hackos, Redish, and Schriver) were also actively developing user-centeredness and task-orientation in documentation

(see Redish, 1989; 2010). The central design elements of minimalism are captured in its four principles presented by van der Meij and Carroll (1995), and they each include a set of heuristics (Table 1).

The first principle states that users should be given an immediate opportunity to act instead of giving general introductions; they should be encouraged to try things out on their own, and help should always be available. The second principle emphasizes the importance of real tasks: The product is not an end in itself, but the user has a real goal to achieve. According to the third principle, errors should be prevented by using hints, and users should be given effective error prevention information. This information should be provided near actions that are error-prone or when it is difficult to recover from the error. Information for correcting the error should be located near the actions where the error might occur. The fourth principle states that the documentation should be concise; not everything needs to be explained (van der Meij, 1995, pp. 244–257). We will discuss the above principles and their applicability in today's technical communication environment further below.

Van der Meij and Carroll (1995, p. 244) have emphasized that neither the principles nor the heuristics

Table 1. Minimalist design principles and heuristics (van der Meij & Carroll, 1995; van der Meij, 2007)

Principle		Heuristic	
1	Choose an action-oriented approach	1.1	Provide an immediate opportunity to act.
		1.2	Encourage and support exploration and innovation.
		1.3	Respect the integrity of the user's activity.
2	Anchor the tool in the task domain	2.1	Select or design instructional activities that are real tasks.
		2.2	The components of the instruction should reflect the task structure.
3	Support error recognition and recovery	3.1	Prevent mistakes whenever possible.
		3.2	Provide error information when actions are error-prone or when correction is difficult.
		3.3	Provide error information that supports detection, diagnosis and recovery.
		3.4	Provide on-the-spot error information.
4	Support reading to do, study and locate	4.1	Be brief; don't spell out everything.
		4.2	Provide closure for chapters.

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of minimalism are rules that should be followed blindly but that they enable better designs. With this in mind, we have taken the main ideas from minimalism heuristics and combined them with the best practices of technical communication. In addition, we have turned the idea of a "design philosophy" (van der Meij, n. d.) into an "evaluation philosophy": Instead of seeing the list of heuristics as a design tool, we see it as an evaluation tool. As discussed below, there is a distinct lack of recent reports on applying minimalism; with the evaluation tool, the current state of documentation in an organization can be evaluated as a low-cost first step towards minimalism.

OBSTACLES TO MINIMALISM

Despite its promise, why has minimalism not spread as widely as expected (Brockmann, 1998, p. 387; Dubinsky, 1999; Rosenbaum, 1998)? According to Dubinsky (1999, pp. 46–47), there are three possible reasons: no minimalism textbook has been available, best practices have not been disseminated effectively, and there has been very little information available on the cost benefits of minimalism. Based on our literature review, the above still seems to apply in the 2020s. Draper and Oatley (2000, p. 223) also point out that there are no hard and fast rules on the structure of minimalist manuals, or on what such manuals should or should not contain (see also van der Meij, 1992, p. 7). This can make it difficult to implement minimalism in the hectic R&D environments in which technical communicators work.

One reason why minimalism has not spread as widely as possible might also be that user-centered thinking has become recognized and established as an essential part of technical documentation, making minimalism just one approach among many. However, our experience during the training program was that even though the awareness of being user-centered and task-centered was high among the participants, it did not necessarily show in the user guides they produced. During the training, it became clear that tasks based on the writer's assumptions or tasks based on feedback from subject matter experts do not necessarily result in a user-centered user guide. Even though the power of contact with users has been recognized (e.g., Ramey, 2000), direct contacts with users remain rare (e.g., Dubinsky, 2015; Virtaluoto, 2015).

A further reason might be cost: User information may be difficult or expensive to obtain (Rosenbaum, 1998, p. 143; see also Nielsen & Loranger, 2006). Minimalist scholarship calls for collecting user data, involving users throughout the process, testing iteratively with users, and observing them performing their day-to-day tasks (van der Meij, 1992; Hackos, 1998; Mirel, 1998; Redish, 1998; Rosenbaum, 1998). According to van der Meij (2017), the production time of a minimalist manual is 30% longer than the production time of a conventional manual. In the business world, there is often very little time for the types of testing and observation techniques that minimalism requires (e.g. Rosenbaum, 1998, p. 122; Virtaluoto, 2015). Consequently, it is all too tempting to focus only on the often-cited minimalism principle of "slashing the verbiage" (e.g., Draper & Oatley, 2000, p. 225), and to neglect paying attention to the user as the key to the types of verbiage which can, in fact, be slashed (Draper & Oatley, 2000, p. 229).

Rosenbaum (1998) has called for publicizing the value added by minimalism practices and also suggested that the existing documentation and the people involved in creating it "supply a great deal of inertia" (p. 144) when new methods are introduced. The sheer mass of legacy documentation may seem daunting, and applying minimalism effectively means that subject matter experts as well as writers must change their traditional ways of working: For example, they may feel uncomfortable about providing incomplete information (Rosenbaum, 1998, p. 119). Dubinsky (1999) has also noted that "implementing minimalist procedures will not be easy" (p. 46). Minimalizing a company's entire documentation set can indeed be costly and time-consuming, and it might be unrealistic to even expect such wide-ranging projects, but it would be helpful to see examples of smaller efforts where some elements of minimalism have been adopted. There is a lack of information on recent, concrete company projects that would give examples of migration into minimalism (see also Pflugfelder, 2013, pp. 135–136).

Minimalism is often discussed in the context of novice users of software (van der Meij, 2007), though its applications for complex systems and expert uses were already raised in one of the seminal works, *Minimalism Beyond the Nurnberg Funnel* (Carroll, 1998). This focus on the learning of novice users (e.g., Draper & Oatley, 2000) is understandable, as

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minimalism has its roots in the 1980s and 1990s, when consumer software was a new phenomenon, as we noted in the Introduction. So, the question is, What types of devices, software programs and users is minimalism effective for? (Kearsley, 1998, p. 403). According to Rosenbaum (1998, p. 131), minimalism works for certain types of documents, such as installation instructions, but not for all document types. Van der Meij (1992, p. 15) has also pointed out that legal requirements may turn minimalists into maximalists; this is especially true of complicated hardware systems. On the other hand, complicated business products may not be suitable for the type of guided exploration minimalism encourages. Williams and Farkas (1992), in fact, have challenged guided exploration overall and regard it as a controversial tenet of minimalism, unlike the other three principles. In their view, guided exploration may be inefficient and frustrating for the learner, lessening their motivation to continue to learn. In addition, it does not allow the user to make decisions about what is important to learn and what is not, and it focuses on declarative knowledge rather than the acquisition of procedural knowledge (Williams & Farkas, 1992, p. 49). Certain minimalist concepts, such as *modularity* (creating stand-alone chunks of documentation) and *fading* (gradually leaving out bits of repetitive information as the user guide progresses) (van der Meij, 1992), can also appear contradictory or even dated. If all topics in a minimalist manual are standalone modules to be read in any order, how can the information for recurring actions be faded as the guide progresses? Today's modular content management systems, on the other hand, have all but resolved the issues to do with uniform structures and modularity in user guidance.

RECENT RESEARCH ON MINIMALISM

As discussed above, there seems to have been a long-standing interest and need for practical applications of minimalism, but little recent data is available on such endeavors. To see if this really was the case and to confirm our experiences during our training program, we went through six prominent technical communication journals, looking for articles highlighting practical use cases of minimalism. The journals were: *IEEE Transactions on Professional Communication*, *Information Design Journal*, *Journal of Business and Technical Communication*, *Journal of Technical Writing and Communication*, *Technical Communication*, and *Technical Communication Quarterly*. We searched for articles published in the past five years, between 2014–2019, using the keywords *minimalism*, *minimalist documentation*, and *minimal manual*, but came out empty-handed. Articles dealing with minimalism in these journals dated back to the 1990s–early 2000s. In one of the most recent articles, van der Meij (2007), discussed three research efforts to improve minimalist strategies but concluded that the insights the studies offered were more general and focused on the "optimization of people's goal-related management and control of attention, time, and effort" (p. 304) rather than minimalism as such.

Some more recent discussions on minimalism have, however, been published elsewhere by, for example, Talley (2012), Thominet (2015), and Ramsay and Terras (2015). In his paper, Talley (2012, p. 291) presented a tentative process documentation model for the Dublin Core Metadata Initiative, with a focus on the elements a minimalist procedure should contain. Thominet (2015) suggested that the principles of minimalism could support amateur authors on writing documentation wikis, where the content is crowd-sourced. The technical communicator's role, then, would be in the production of guides on how to write content instead of the production of the actual content on the wiki sites. He sees the wikis and other crowd-sourced content as better in tune with the user's needs than traditional documentation. Ramsay and Terras (2015, p. 373) discussed minimalism in the context of providing user guidance in e-learning environments and see it as a strong foundation in building e-learning instruction. This is perhaps not surprising, as minimalism was originally a theory of learning (Draper & Oatley, 2000, p. 223). According to Ramsay and Terras (2015), advances in user interface design have been so great that the "quest for supremely fluid, usable, effective and pleasurable interactions has to a very great extent been won" (p. 374). They use automated teller machines as an example of technologies which are so easy to use that they require no user guidance, thanks to advances in user interface design. However, the functionality of a teller machine is very limited, whereas the kinds of information systems today's workplaces require us to use are so complex that using them effectively will require guidance into the foreseeable future.

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In addition to academic articles, there are other efforts to develop and spread minimalism. The Center for Information-Development Management (2019) has been actively promoting minimalism through publications, blogs, webinars and other training events, and Flacke (2015, 2019) has specified and provided examples of what minimalism can mean in concrete terms at the documentation level through training events and various online resources. Another noteworthy dimension in the application of both minimalism and the best practices of technical communication is the role of international standards. For example, the standard for developing user documentation in agile environments (International Organization for Standardization, 2018) offers several techniques for designing user documentation based on user needs and requirements, which supports the user-centeredness of minimalism. Minimalism is also included in the IEC/IEEE 82079-1:2019 Preparation of information for use (instructions for use) of products — Part 1: Principles and general requirements standard (International Organization for Standardization, 2019).

Although many obstacles to minimalism have been presented, the approach is both sound and noteworthy enough in the field of technical communication to warrant further development. During our training program, we not only started reviewing the original minimalism heuristics, but also examined some existing documentation process models (e.g., Hackos, 1994; Reiss, 2018) to evaluate them against the minimalist approach. We noticed that the user was often only implicitly mentioned in the process (see also van Laan & Julian, 2001). To apply minimalism efficiently, however, the user must be at the center of the activity, which is why we designed the minimalist documentation process presented below. In the process model, we aimed at simplicity and explicit user focus throughout. This is by no means a new approach, as user-orientation is included in many other documentation process models such as Redish (2000, p. 164; for an overview of different models, see Kister, 2016). However, we wanted to offer our own end-to-end solution for creating minimalist documentation so that we could pinpoint the process stages in which the minimalism heuristics can be used and explicitly highlight the role of the user. As discussed in this article, user-orientation is the dominant ethos of modern technical communication, but based on our experience during the training program and in various professional contexts, it is often hard to achieve. Hence, the importance of the user must be made explicit on the process level.

THE MINIMALIST DOCUMENTATION PROCESS

The minimalism heuristics discussed in the next section are designed to work with the minimalist documentation process (Virtaluoto et al., 2018), where the aim is to ensure that user documentation is created and evaluated with the principles of minimalism in mind. We agree with Anson (1998, pp. 94–96; see also Dubinsky, 1999, p. 38), who emphasizes that minimalism needs to be incorporated throughout the life cycle of system development. The process, depicted in Figure 1, begins with a focus on the user and the user's needs for information.

Usability methods; such as observation, personas, or use cases (Draper & Oatley, 2000; Strimling, 2018, p. 9); are helpful in the first phase: "Collect User and Product Information." Written sources, such as feedback, quality data, test cases, and requirement specifications, to name just a few, offer invaluable background information in this phase (van Laan & Julian, 2001, p. 64). People working with the product as well as people working with customers and users are also an invaluable asset, as the technical communicator may not have direct access to the users (Dubinsky, 2015; Virtaluoto, 2015), but someone in the organization does have access (Hackos, 2007). Other sources, such as in-house testing, discussion forums, and analytics—as well as benchmarking and research data from sales and marketing—can offer a new perspective on the process.

In the "Plan" phase, it is crucial to always go through the entire user journey (Draper & Oatley, 2000, p. 227; Spinuzzi & Zachry, 2000; Strimling, 2019) instead of merely updating old documentation with new product features. The focus must be on what users do at each touch point on their journey with the product-to-be-documented and what they need at those specific points. The format and structure of the documentation as well as the publishing channel also need to be planned to match the user's needs; for example, a quick guide, built-in help, and an online portal each offer unique benefits and drawbacks, and, in most cases, any single solution will not cover all

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the bases. The visual outlook of the documentation is also planned in this phase—is it possible to present information in other ways than text? Is it possible to create the images first?

In the "Write and Illustrate" phase, the focus should be on the actual core tasks of the user (van der Meij & Carroll, 1995, p. 245). General readability principles, such as appropriate and familiar terms, everyday vocabulary, consistency, clarity, and the use of the active tense also apply (van Laan & Julian, 2001, pp. 211–226; Schriver, 2014). In this phase, terminology work might also be useful as it provides the principles of a "good term" that can be found in textbooks and research for terminology work (e.g., Sager et al., 1980; Schmitz, 2007).

In the "Review and Test" phase, the minimalism heuristics presented below can be used to test the usability of the documentation (van der Meij & Carroll, 1995, p. 251). Reviews and tests conducted with the users also provide invaluable information about the product's usability in addition to the documentation, and, as such, are also important to the R&D process. Face-to-face reviews are "exhaustive and exhausting" (van Laan & Julian, 2001, p. 130), but they are helpful as they make sure everyone has the necessary information. According to Schriver (1997, pp. 471–473), all reader groups benefit from user-focused revisions.

The documentation is then "Updated" based on the reviews and tests, and the "Final Review" is arranged.

The aim is to "Publish" often and "Collect Internal and External Feedback." There must be a feedback process in place to keep the user in the picture.

Minimalism does not delve very deeply into the work process of creating documentation, but it is recommended in technical communication literature that product and information designers work together (Schriver, 1997, p. 246) to create useful documentation. In our minimalism process, we have also included other stakeholders; technical communication, by definition, involves communicating with a variety of people to form a complete picture of the product and the user. The R&D phases obviously affect the creation as well as the evaluation of documentation: For example, it may be impossible to write and test the troubleshooting information until after the release of the product. It is also a well-known issue in technical communication that the subject matter experts (SMEs) are busiest with their own work at precisely the same time when technical communicators would need them the most. This means that detailed product knowledge may not be readily available when it is needed. An efficient documentation process to which the entire organization is committed is a way to avoid some of these pitfalls.

Next, we will move to presenting the minimalism heuristics we have created based on the four major principles of minimalism.
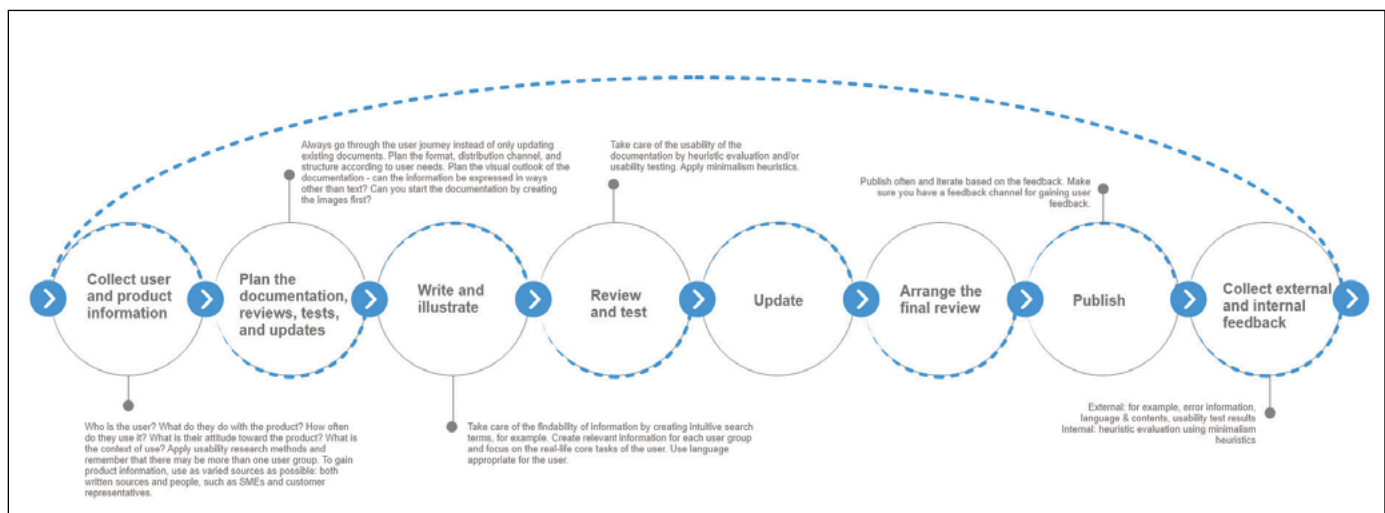

Figure 1. The Minimalist Documentation Process; first published in Virtaluoto et al., 2018, p. 195

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REVISED MINIMALISM HEURISTICS

In her article published in *Minimalism Beyond Nurnberg Funnel*, Redish (1998, p. 243) suggested that modifications may be needed to the minimalism heuristics to broaden the domain of deliverables and different user groups. In Table 2, we offer a revised version of the heuristics. They have been divided under three headings instead of van der Meij and Carroll's (1995) original four. Our aim has been to transform the heuristics into an evaluation tool which can be used at

the "Review and Test" and "Collect Internal and External Feedback" phases of the minimalist documentation process (see also Rosenbaum, 1998, p. 121).

As stated in the Introduction, we combined the best practices of technical communication with minimalism. After all, the central concept in minimalism discussed above—user-centeredness—is recognized as a key issue in technical communication literature, too (e.g. Price & Korman, 1993, p. 30; van Laan & Julian, 2001, p. 55). It is also the underlying principle in the minimalist documentation process as well as the revised

Table 2. Revised minimalism heuristics. In the Table, OH followed by a number refers to the corresponding original minimalism heuristic as presented in Table 1.

MINIMALISM HEURISTICS	
1 CORE TASKS AND GOAL-ORIENTATION	
Core tasks	1.1 Does the documentation concentrate on the user's core tasks? (OH2.1)
	1.2 Does the documentation reflect the real-life structure of each task? (OH2.2)
	1.3 Does the documentation explain why the task is done, in addition to how? (OH2.2, Extended)
Getting to work immediately	1.4 Can the users start working on real-life tasks immediately? If the documentation contains general information, prefaces, or introductory information before the steps, is the information concise and necessary? (OH1.1; OH4.1 Extended)
Immediate assistance	1.5 Is the documentation available when needed? (OH1.3)
	1.6 Does the user get targeted instructions at the relevant touch points on the user journey? (OH1.3, Extended)
2 ACCESSIBILITY	
Content	2.1 Is the documentation as concise as possible in its overall selection of contents? (OH4.1)
Findability	2.2 Is the overall structure of the documentation logical and consistent? Are all topics/sections structured in the same way? (OH4.2, Extended)
	2.3 Do the users find what they are looking for? Does the documentation contain: (OH3.1, Extended) • a clear and precise table of contents • a clear and intuitive index • clear, intuitive headings and keywords • an accessible and intuitive search functionality for online or electronic documentation?
Understandability	2.4 Is the information in the documentation easy to understand? Does the documentation contain: (OH3.1, Extended) • long tasks broken into shorter sequences • clear, action-oriented steps • short, simple sentences • verb forms relevant to the information type • terminology that is appropriate to the user group • clear, simple language?

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MINIMALISM HEURISTICS	
Visuals	2.5 Is the documentation visual? • Have graphics, images, videos, etc., been used where appropriate? • Are the visuals relevant? • Are the visuals used consistently? • Are the visuals clear and readable both online and in print? • Are the visuals clearly labelled (titles, figure numbers, etc.)? • Are the images and text in the documentation clearly connected using callouts, for example?
3 ERROR MANAGEMENT	
Preventing errors	3.1 Have errors been prevented? (OH3.1)
Warnings and notes	3.2 Have all the applicable safety standards and legislation (e.g. the Machinery Directive) been taken into consideration in the documentation? (OH3.1, Extended)
	3.3 Are all the warnings and notes necessary? (OH4.1)
	3.4 Are the warnings and notes located next to the relevant procedure? (OH3.4)
Error recognition	3.5 Does the documentation offer error information: recognition, diagnosis, solution? (OH3.3)
	3.6 Is the error information located close to the relevant procedure? (OH3.4)
Troubleshooting	3.7 Does the documentation contain a troubleshooting section? (OH3.1, Extended) • Is the troubleshooting section clearly visible in the table of contents? • Does the troubleshooting section contain the problems most often faced and/or reported by the users of the product?

minimalism heuristics. In the following, we will explain the links between the heuristics and the best practices of technical communication.

Core Tasks and Goal-Orientation

It has been stated that when designing new information, the writer must be aware of the users' activities and the resources at their disposal (Spinuzzi, 1999, p. 21), and the information presented must fit the user's context of use (Price & Korman, 1993, p. 294). According to van Laan & Julian (2001, p. 55), it is impossible to design a usable document without knowing what the intended user's needs are. In addition, it is important to supply the user with motivation, which supports them in completing their tasks (Loorbach, 2013, p. 6). In minimalism, the focus is also on the real-life tasks of the user (van der Meij & Carroll, 1995, p. 252). In the revised minimalism heuristics, these principles are applied in the following heuristics:

1.1 Does the documentation concentrate on the user's core tasks? (OH2.1)

1.2 Does the documentation reflect the real-life structure of each task? (OH2.2)

1.3 Does the documentation explain why the task is done, in addition to how? (Extension of OH2.2; provides context)

Another key issue in minimalism, goal-orientation, which Wright (1994, p. 12) called the ease with which users can attain their goals, has been considered the single most important quality criterion for customer documentation. In the revised minimalism heuristics, this principle is applied in the following heuristics:

1.4 Can the users start working on real-life tasks immediately? If the documentation contains general information, prefaces, or introductory information before the steps, is the information concise and necessary? (OH1.1; OH4.1 Extended)

1.5 Is the documentation available when needed? (OH1.3)

1.6 Does the user get targeted instructions at the relevant touch points on the user journey? (OH1.3, Extended)

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In heuristic 1.4, van der Meij & Carroll's (1995) idea of getting started on real-life tasks immediately has been supplemented with concrete examples by Flacke (2015).

Accessibility

For the next three heuristics, we found support in Strimling's (2019) recent article where he presented a concise list of documentation quality factors: a good document is accurate, relevant, easy to understand, and accessible. In addition to being accurate, a good document is also complete and consistent (van Laan & Julian, 2001, p. 47). Especially for instructive texts, Göpferich (1998, p. 245; 2007, p. 430) emphasizes concision and calls for reducing redundancy. In the revised minimalism heuristics, these principles are applied in section 2:

2.1 Is the documentation as concise as possible in its overall selection of contents? (OH4.1)

In minimalism, it is recommended to provide a "home base" for the reader: Each chapter or module should start and end in the same way to provide closure and to be as independent as possible (van der Meij & Carroll, 1995, p. 257; see also van Laan & Julian, 2001, p. 219). Today's modular documentation systems have all but resolved this issue, as we noted above. There are DITA (Darwin Information Typing Architecture) templates for each information type, which means that a procedure, for example, always follows the same structure, and all the modules are written, stored, used, and even translated independently of each other (see also Stevens, 2018). This is why we have not focused on this issue in our heuristics. Instead, revised heuristic 2.2 covers the structure of the document set as well as each individual module:

2.2 Is the overall structure of the documentation logical and consistent? Are all topics/sections structured in the same way? (OH4.2, Extended)

We have also omitted the principle of guided exploration. In addition to being a challenged aspect of minimalism in general (Williams & Farkas, 1992), it does not sit well with heavy industry or hardware products and may feel patronizing with software, too. In today's digitalized world, people are comfortable with technology in a completely different manner than they were in the 1990s, as we stated earlier.

Both minimalism and technical documentation literature state that documentation must be designed so that the main ideas catch the reader's attention.

In addition, the used language, both visual and verbal, must connect with the reader's knowledge and experience (Schriver, 1997, p. 166; van der Meij & Carroll, 1995, p. 249). In minimalism, it is recommended that the headings in a document should reflect the task structure and help users find the information they need (van der Meij & Carroll, 1995, p. 250; Stevens, 2018), while allowing them to skim the document (van der Meij & Carroll, 1995, p. 250; see also Schriver, 1997, p. 165). A good document uses language that is clear and consistent, avoids jargon and presents the information using the active and imperative voice (Anson, 1998, p. 95; van Laan & Julian, 2001, pp. 211–226; Price & Korman, 1993, pp. 361–376; Rosenbaum, 1998, p. 143; Schriver, 2014). In minimalism, these issues are discussed in heuristic 3.1: They are seen as ways to prevent errors (van der Meij & Carroll, 1995, p. 252), but in the revised heuristics they fall under accessibility:

2.3 Do the users find what they are looking for? Does the documentation contain: (OH3.1, Extended)
- a clear and precise table of contents
- a clear and intuitive index
- clear, intuitive headings and keywords
- an accessible and intuitive search functionality for online or electronic documentation?

2.4 Is the information in the documentation easy to understand? Does the documentation contain: (OH3.1, Extended)
- long tasks broken into shorter sequences
- clear, action-oriented steps
- short, simple sentences
- verb forms relevant to the information type
- terminology that is appropriate to the user group
- clear, simple language?

Flacke (2015) has again provided concrete examples for van der Meij & Carroll's (1995) fourth principle of minimalism by emphasizing the importance of tables of content, indexes, and clear headings. However, the first element in heuristic 2.4—breaking long tasks into shorter sequences—might not be possible for complicated and large business products and systems (Rosenbaum, 1998, p. 124). In general, technical communication recommendations concerning language seem to be in tune with minimalism, but in technical communication the language used is positive (van Laan & Julian, 2001, p. 218): The aim is to not

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blame the user when something goes wrong. In other words, statements such as "You have chosen a wrong command" or "You have positioned the cursor wrongly" (van der Meij & Carroll, 1995, p. 255) are not generally favored. Instead, the user is told what to do to fix the situation: "Choose the correct command" or "Position the cursor correctly." In the spirit of "slashing the verbiage" discussed above, positive language and the imperative voice often make for shorter sentences, too. Conciseness is a key aspect in minimalism (Stevens, 2018).

The visual aspects of the document are also important in the sense that words and images that "work well together" (Schriver, 1997, p. 408) get the message across better than either one alone. Illustrations or graphics can focus readers' attention, highlight concepts, aid recall, and help readers grasp relationships described in the text (Haramundanis, 1998, p. 124). Conciseness and visual clarity make the document more approachable: they convey the image that the document will not be hard work (van der Meij & Carroll, 1995, p. 256). Effective visualization involves the use of clear, relevant graphics and the titling and consistent numbering of all visuals, for example (Haramundanis 1998, pp. 124–126; Graves & Graves, 2012, p. 145). In the revised minimalism heuristics, the above principles are applied in the following heuristic:

2.5 Is the documentation visual?
- Have graphics, images, videos, etc., been used where appropriate?
- Are the visuals relevant?
- Are the visuals used consistently?
- Are the visuals clear and readable both online and in print?
- Are the visuals clearly labeled (titles, figure numbers, etc.)?
- Are the images and text in the documentation clearly connected using callouts, for example?

Error Management

It is recognized in technical communication that a good document must present troubleshooting information (Schriver, 1997, p. 245; van der Meij, 2017) and allow the readers to distinguish problems that are their own fault from those that are not (Schriver, 1997, p. 247). However, minimalism goes further, which is why the minimalist approach to error information is perhaps the most notable contribution that minimalism can offer

(van der Meij, 1992, p. 15; Draper & Oatley, 2000, p. 226). The aim is to offer ample error information near error-prone actions, which reduces anxiety and supports learning (van der Meij & Carroll, 1995, pp. 250–252; Stevens, 2018; see also Schriver, 1997, p. 247). We know that users frequently experience problems with the products they use, and these problems must be anticipated and addressed in the instructions (van der Meij, 2007, p. 301). In addition, the effect of these problems on the user's emotions and attitudes may be significant, which means that they require specific attention (Schriver, 1997, p. 211). In the revised minimalism heuristics, these principles are applied in the following heuristics:

3.1 Have errors been prevented? (OH3.1)
3.2 Have all the applicable safety standards and legislation (e.g. the Machinery Directive) been taken into consideration in the documentation? (OH3.1, Extended)
3.3 Are all the warnings and notes necessary? (OH4.1)
3.4 Are the warnings and notes located next to the relevant procedure? (OH3.4)
3.5 Does the documentation offer error information: recognition, diagnosis, solution? (OH3.3)
3.6 Is the error information located close to the relevant procedure? (OH3.4)
3.7 Does the documentation contain a troubleshooting section? (OH3.1, Extended)
- Is the troubleshooting section clearly visible in the table of contents?
- Does the troubleshooting section contain the problems most often faced and/or reported by the users of the product?

In the next section, we will briefly explain the use of heuristic expert evaluation as a tool and present a pilot case where the revised minimalism heuristics were tested.

Using the Heuristics as an Evaluation Tool

The existing minimalism literature gives little information on conducting a heuristic evaluation, a method where experts evaluate and identify the compliance of a product against a list of recognized principles. This is why we turned to guidelines presented in other fields, mainly usability research. First described in Nielsen and Molich (1990), heuristic evaluation is the best-known expert evaluation method (Petrie & Power, 2012, p. 2107). With this method,

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expert and/or novice evaluators use a list of principles, namely heuristics, to assess the level of usability in software. They observe problems that do not follow those principles and determine a solution for each one.

Heuristic evaluation is commonly used because it is inexpensive relative to other evaluation methods. It is also flexible: It can be obtained early in the design process, and it can be used together with other methodologies (Nielsen & Molich, 1990). However, it has some degree of subjectivity (Dumas & Redish, 1993), as it is based on the subjective judgment of the evaluators. Paz et al. (2013, p. 120) argue that the clarity of the heuristics is the key to a successful evaluation.

In technical communication, heuristic evaluation has been used to evaluate documentation, both printed (Abtsm et al., 2014) and digital (Greenough & Fakun, 2002; Kantner et al., 2002), as well as online help applications (Wallace et al., 2013). As a part of her MA thesis, Rautava (2018, English summary, p. 9) created heuristics for user documentation of mobile applications, making use of minimalism principles. These studies, among others, are good examples of the agility of heuristic evaluation: Heuristics can be tailored to suit the project at hand. Similarly, our minimalism heuristics are not intended as rules or guidelines (see Dubinsky, 1999, p. 46), but as a starting point, which can be tested and revised as needed.

Although there are various ways to conduct heuristic evaluation, the evaluation process usually contains the following steps: 1) establishing an appropriate list of heuristics, 2) selecting and briefing evaluators, 3) conducting the evaluation, 4) determining the severity of the findings, and 5) discussing the outcome with other evaluators (e.g., Evans & Sabry, 2003). Our pilot project, a one-day minimalism workshop where we tested the heuristics, primarily followed this process. The workshop was arranged in January 2018 with 27 participants from a large, international company that is a world leader in its field. Before the workshop, the company sent us three existing user guides, which we reviewed using our heuristics.

At the start of the workshop, we gave an introductory, three-hour lecture which covered the principles of minimalism, the revised minimalism heuristics, and an overall explanation of heuristic evaluation. As we had received three user guides

from the company's documentation set prior to the workshop, we were able to use real-life examples in the introductory lecture. However, we did not have a chance to organize a pre-evaluation workshop to train the evaluators, as in Evans and Sabry's (2003, p. 91) study. If there is time, a pre-evaluation workshop of this type may improve the quality of the findings.

The participants were then divided into seven groups, and each group of three to four participants received one of the three user guides. We also provided the participants with an Excel sheet where they could list the issues they discovered in the evaluation, in addition to a recommendations section for suggesting ways to fix the issues. Nielsen (1994) recommends using three to five evaluators, as different people are likely to find different problems, whereas a larger number does not yield a great deal of additional information. The participants then had to decide on the scope of the evaluation, i.e., which part of the document they were going to evaluate. In other words, each group chose only a short section to concentrate on and try out the heuristics. They were given 30 minutes to work individually to examine the section and judge its compliance with the minimalism heuristics. They were asked to list each problem separately and provide a recommendation for improvement.

After the independent work, the participants discussed their findings first with their group and then in larger groups of seven to eight people who had worked on the same guide, listed the three main points they discovered. This took about 1.5 hours. Finally, a 45-minute group discussion took place where the groups presented their three-point lists to everyone, followed by a workshop wrap-up. In the wrap-up discussion, the participants offered us some general feedback about the workshop and using the heuristics. Based on the feedback, we have revised our workshop template so that the participants now familiarize themselves with minimalism before the workshop, using materials provided by us, and after a short recap lecture, the entire day is then spent on applying and discussing the heuristics. The template is, of course, adapted for each workshop.

The pilot study showed that even in a short time and after a very brief introduction to minimalism, the participants were able to apply the minimalism heuristics and come up with recommendations for improvement. We were also able to revise our

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initial list of heuristics based on the pilot study. For example, we added one of the elements in heuristic 2.5 (connecting text and images) and included safety standards in heuristic 3.2 once we realized that it is crucial in various industries, such as those involving heavy machinery. In addition, we fine-tuned some details as well as the overall structure of the whole heuristics list. During the workshop, we also noticed that different professional roles are important in applying the individual heuristics effectively. For example, the heuristics related to the core tasks of the user require a thorough knowledge of the user and the functionality of the product, which means that input from SMEs and user representatives is useful for these. On the other hand, some of the heuristics — such as those related to the language or structure of the documentation — can be most effectively applied by non-SMEs, as they have the most expertise in those areas; it may be possible to evaluate the language level based on previously created user personas. The aim is to apply the heuristics flexibly, as needed, throughout the minimalist documentation process.

CONCLUSION

In this article, we presented a revised set of minimalism heuristics, which can be applied in day-to-day technical communication work to evaluate the quality of the produced documentation. Building on the heuristics originally developed by van der Meij and Carroll (1995), the focus was on the user and the user's needs for accessible information at different points of the user journey. The revised heuristics are intended to be used as part of the minimalist documentation process, also presented in this article. We discussed the heuristic evaluation process through a company pilot study, which allowed us to revise the heuristics further. When the minimalist approach becomes more mature in organizations, there might also be a need to develop a minimalist style guide for design purposes, for which the heuristics can be used as a starting point. This would anchor the minimalist principles into the technical communication process even more firmly.

As discussed above, minimalism requires much input and effort from organizations. They have to adopt different types of usability research methods and use them iteratively throughout the documentation process, as well as train writers and information designers to

use that research data according to the minimalist principles. This requires the entire organization to adopt a new mindset, where the documentation is integrated into the product creation process, from the initial requirements to the production, delivery, and maintenance phases. Modularity and DITA seem to provide some answers regarding the consistent structure, reuse possibilities, and versatile publishing channels of documentation, but if user-centeredness is missing, true minimalism is difficult to put into practice. However, the entire R&D organization needs user information to produce usable products: Technical communicators could be an invaluable asset in creating and interpreting this information.

Perhaps the most important contribution of minimalism to technical communication is its focus on error information. However, this type of information may be difficult to obtain: Not all error-prone situations are known before the product is taken into widespread use, and companies may also wish to focus on the product features rather than error situations in the instructions, because of branding and corporate image issues, for example. Many companies also sell installation and maintenance services for business products, in which case a comprehensive account of all possible error situations can be seen to reduce expected revenue. It is also possible that the troubleshooting information related to the product is delivered by a different department and through different channels than the main documentation set. In this case, the troubleshooting information may never get integrated with the rest of the product information. This, again, requires effective information gathering and dissemination processes within the organization.

In the end, it is the user who determines the quality of the documentation. Regarding the usability of the revised heuristics presented in this article, the next step is to have further testing. For example, a research setting where a documentation set is tested with real users before and after deploying the heuristics would provide valuable information for further development. Overall, the heuristics are intended to be modified to suit different companies, products, and users: Knowing the user is key. They can also be tested in different environments. Commercial software and business hardware, for example, often seem to come from two different worlds and require different types of tools in technical communication, too. All fields, however,

would benefit from low-cost, easy-to-apply tools which can be applied flexibly.

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Cultural Differences and the Structure of User Instructions: Effects of Chinese and Western Structuring Principles on Chinese and Western Users

By Qian Li, Menno D. T. de Jong, and Joyce Karreman

ABSTRACT

Purpose: Although various researchers have paid attention to differences in the way Chinese and Western documents are structured, only few have investigated how Chinese and Western users differ in their way of using instructions. This study experimentally investigates the effects Chinese and Western manual structures have on Chinese and Western users, in terms of task performance, user satisfaction, and information selection.

Method: A 3x2 randomized experiment (N = 127) was conducted, with participants' cultural background (Chinese living in China, Chinese living in the Netherlands, and Westerners) and manual structure (Chinese versus Western) as independent variables and task performance, user satisfaction, and information selection as dependent variables. Supported by a manual, participants performed tasks with Excel and afterwards filled out a satisfaction questionnaire. To investigate information selection, eye-tracking data were collected.

Results: Regarding task performance and user satisfaction, no significant main and interaction effects were found. Regarding information selection, our research confirmed some of the hypothesized differences between Chinese and Western users: Chinese users pay less attention to structuring elements (table of contents and headings) and more attention to visuals.

Conclusion: Our findings suggest that cultural adaptations of the structure of manuals do not really matter: Chinese and Western users perform equally well and have similar satisfaction scores with Western and Chinese manual structures. Paradoxically, the differences found in users' information selection behaviors provided some support for the differences in document design practices. However, users of both cultures appear to be sufficiently flexible in using instructions that are not culturally adapted.

KEYWORDS: cross-cultural communication; cultural differences; user instructions; information selection; user satisfaction

Practitioner's Takeaway:

- Cultural adaptations of the structural characteristics of user manuals do not seem to matter for the effectiveness and efficiency of task performance or users' satisfaction with the manual or the product.
- Differences between Chinese and Western manual structures uncovered by content analytic research seem to correspond to differences in information selection behaviors of Chinese and Western users.
- Chinese users differ from Western users in two ways: the way they use structuring elements in user manuals (such elements are less important to them) and in the extent to which they rely on visuals in manuals (visuals are more important to them).

CULTURAL DIFFERENCES IN STRUCTURING USER INSTRUCTIONS

INTRODUCTION

In modern societies, technology is more pervasive than ever before. All kinds of technologies, varying from simple household devices to complex professional software applications, profoundly affect our lives. Technical communicators are the professionals responsible for bridging the gap between technological possibilities and users' needs, desires, and preferences. An important way of doing so is by creating, facilitating, and maintaining forms of user support. The nature of user support has developed in various directions, including video instructions (Van der Meij, 2018; Van der Meij & Van der Meij, 2013), helpdesks (Robles, 2018; Van Velsen et al., 2007), and user forums (Frith, 2014; Swarts, 2015), but written instructions are still one of the prominent ways of helping users.

Technology not only affects our private and professional lives, it also has dramatic effects on society as a whole. One of those effects is that it has globalized the world we live in. People's mobility all over the world has rapidly increased and national markets for products are developing into global ones. As a result, manufacturers of technical products increasingly have to consider the possible effects of national and cultural differences on their products as well as on the user support for their products. Technical communication therefore has a strong tradition of research into translation and localization (Batova, 2018, 2019; Batova & Clark, 2015; Lentz & Hulst, 2000; Sun, 2006, 2012).

In addition, various authors focused on differences in document design practices between cultures. The research, so far, predominantly aimed at comparing Western and Chinese technical communication practices. This has practical and intrinsic reasons. Practically, technological developments in China and the country's openness to the rest of the world have gone through spectacular developments in the past decades. China has developed from a closed country to an influential world player, and from a manufacturing to a high-tech developing country. Intrinsically, comparing Western cultures with China is interesting because the cultural distance is assumed to be quite large.

Using variations of content analysis, various researchers tried to make sense of differences in document design practices (Barnum & Li, 2006; Ding, 2003; Dragga, 1999; J. Wang, 2007; Q. Wang, 2000;

Y. Wang, & Wang, 2009; Yu, 2009). The results of these studies complement each other and sometimes point in different directions, which might be attributed to their small-scale data collection, variety of documents used, and rather informal analysis approach (without explicit coding schemes and assessments of inter-coder reliability).

To overcome these shortcomings, Li et al. (2020) conducted a comprehensive content analysis, comparing 50 Chinese and 50 Western manuals for household appliances. In their coding scheme they incorporated the insights from all earlier content analytic studies comparing Chinese and Western documents. They focused on three aspects of user instructions: content, structure, and visuals, leaving out style because it would be too hard to reliably assess in a quantitative content analysis. Their results confirmed that there are cultural differences in all three aspects. Regarding content, the overall difference is that Chinese manuals appear to be less confined to the function of supporting end users than Western manuals. Chinese manuals pay more attention to advertising and relationship-building, and also focus on serving technical experts. Regarding structure, the main difference is that Chinese manuals are less strictly organized than Western manuals. The manuals contain comparable numbers of structuring elements such as headings or lists but use them differently: Chinese manuals have less hierarchy in headings, fewer standout elements in the text, and less functional chunking of information. Regarding the use of visuals, the main difference lies in the use of entertaining and human-oriented visuals in Chinese manuals (such as cartoons and visuals with human figures) versus a restriction to entirely instrumental visuals in Western manuals.

The problem of such content analytic research, however, is that it is uncertain whether the differences found correspond to different user preferences or merely reflect the current state of the art in document design habits. For decisive answers about cultural differences, user research is needed. So far, only a few researchers have taken up this challenge, with very different approaches and somewhat scattered results. In this article, we describe a comprehensive experimental study into the effects Chinese and Western manual structures have on Chinese and Western users. Specifically, we focus on task performance, user satisfaction, and information selection.

CULTURAL DIFFERENCES AND THE STRUCTURING OF INFORMATION

The structuring of information is an important aspect in the body of knowledge of technical communication (Van der Meij et al., 2009). One of the basic principles of technical communication as it developed in Western cultures involves the chunking of information, to optimally facilitate the switching between instructions and task execution. Another fundamental principle is that users must be optimally supported to select the information they need in a specific situation. Assumptions of users reading linearly before they start executing tasks are not considered to be tenable. These principles can also be found in the influential minimalist approach of writing user manuals (Van der Meij & Carroll, 1995).

Earlier content analytic studies into cultural differences in technical communication therefore focused strongly on differences in structure between Western countries and China (Barnum & Li, 2006; Ding, 2003; Dragga, 1999; J. Wang, 2007; Q. Wang, 2000; Y. Wang, & Wang, 2009; Yu, 2009). The most comprehensive content analysis, which summarized and quantitatively tested the insights from earlier studies in a sample of 50 Chinese and 50 Western manuals, was conducted by Li et al. (2020). In that study, several conclusions were drawn about structural differences between Chinese and Western manuals for household appliances.

In contrast to several earlier content analyses, Li et al. (2020) concluded that there is no difference in the number of structuring elements between Chinese and Western manuals, but there are fundamental differences in the way they are used. To summarize their main findings, Chinese manuals have a flatter structure (more first-level headings and fewer higher-level headings), use more visual cues to signal headings, do not seem to systematically and rigorously chunk information into meaningful steps, and contain fewer standout elements (such as tips and warnings presented in a box).

Assuming that such structural differences found in content analytic research reflect the needs and preferences of users from both cultures, a number of hypotheses can be formulated regarding task performance and user satisfaction. For task performance, we distinguish between effectiveness and efficiency; for user satisfaction, we distinguish between satisfaction with the structure of the manual, the manual's overall usability, and the software package. This leads to the following hypotheses:

Task Performance
H1a   Chinese participants working with the Chinese manual structure work more effectively than Chinese participants working with the Western manual structure.

H1b   Western participants working with the Western manual structure work more effectively than Western participants working with the Chinese manual structure.

H2a   Chinese participants working with the Chinese manual structure work more efficiently than Chinese participants working with the Western manual structure.

H2b   Western participants working with the Western manual structure work more efficiently than Western participants working with the Chinese manual structure.

User Satisfaction
H3a   Chinese participants working with the Chinese manual structure are more satisfied with the structure of the manual than Chinese participants working with the Western manual structure.

H3b   Western participants working with the Western manual structure are more satisfied with the structure of the manual than Western participants working with the Chinese manual structure.

H4a   Chinese participants working with the Chinese manual structure are more satisfied with the usability of the manual than Chinese participants working with the Western manual structure.

H4b   Western participants working with the Western manual structure are more satisfied with the usability of the manual than Western participants working with the Chinese manual structure.

H5a   Chinese participants working with the Chinese manual structure are more satisfied with the software package than Chinese participants working with the Western manual structure.

H5b   Western participants working with the Western manual structure are more satisfied with the software package than Western participants working with the Chinese manual structure.

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In addition, we formulated a number of hypotheses about users' information selection. On the basis of the aforementioned content-analytic findings we hypothesized that Chinese participants pay less attention to structuring elements in the manual. Based on another content analytic finding regarding the information contained in manuals—suggesting that Chinese manuals contain more contextual information, for instance to establish a good relationship with the user (Li et al., 2020)—we hypothesized that Chinese participants pay more attention to such contextual information. And based on several earlier content analyses (Carroll & Delin, 1998; Y. Wang & Wang, 2009; Zhu & St.Amant, 2007) and a user study by Honold (1999), all suggesting that visual information is more important in Chinese user instructions, we hypothesized that Chinese users pay more attention to visuals and Western users pay more attention to text. This leads to the following hypotheses:

Information Selection

H6   Chinese participants pay less attention to the table of contents than Western participants.

H7   Chinese participants pay less attention to headings than Western participants.

H8   Chinese participants pay more attention to contextual information than Western participants.

H9   Chinese participants pay more attention to visuals than Western participants.

H10   Chinese participants pay less attention to textual information than Western participants.

EARLIER RESEARCH

In the technical communication literature, only four studies can be found addressing the effects of cultural differences on users. Honold (1999) used a combination of focus groups, questionnaires, and usability tests to make sense of the way Chinese and German users would learn how to use a cell phone. The results suggest that German users value paper manuals more than Chinese. In addition, Germans have different preferences for visuals, preferring overviews of the functionality where Chinese want pictorial information about procedures. In relation to the structuring of information, Honold found that Germans have a need for clear overviews and a detailed

index, while Chinese want to start with step-by-step information about basic functions, and think that the importance of information should be related to the size of the characters used.

Zhu and St.Amant (2007) used a qualitative evaluation approach to examine how American users perceive the structure of Chinese-created websites about traditional Chinese medicine. They uncovered various problems including a poor connection to users' prior knowledge, an organization that did not conform to their expectations, and a failure to provide detailed information. These results hint at the existence of cultural differences, although we cannot be sure that Chinese users would not experience the same problems. Moreover, the number of participants in this study was rather low.

Y. Wang and Wang (2009) conducted user research comparing German and Chinese mechanics using technical automobile documentation, evaluating their comprehension of text and visuals and their navigation. Their results, however, were not very informative about the relationship between document characteristics and cultural background. They found that Chinese mechanics outperformed their German colleagues in in the comprehension test. They also found that the navigation strategies tended to differ between the two cultural groups: Germans considered more potentially important topics than Chinese, and often went from specific to general information, whereas the majority of the Chinese went from general to specific information.

Li et al.(2015) conducted the only experimental research so far. Focusing on the structuring of information, they experimentally compared the performance and appreciation of Western and Chinese users working with a carefully manipulated Chinese or Western version of a software manual. They did not find any significant difference of the users' cultural background or the manual version. Western and Chinese users appeared to work equally well with both versions of the manual. However, they reported some methodological shortcomings that might have affected the results. First, the manual was rather short and the participants appeared to be reluctant to actually use the manual. A situation in which structure matters more and participants must use the instructions would have been better. Second, the user instructions were based on an existing manual and the limited guidance from the then available content analytic studies—as a result,

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both the Chinese and the Western manual version may not have been optimal. And third, the Chinese participants were in fact Chinese living and studying in the Netherlands and might have been influenced by the Western environment they had lived in.

The study reported in this article can be seen as a follow-up to the study by Li et al. (2015). We designed a more comprehensive experiment that overcomes the shortcomings of that study.

METHOD

Experimental research is the only way to make causal inferences about the effects different manual versions have on users. An experimental approach would imply that participants are randomly assigned to one of the two versions of the manual and that any differences found can only be ascribed to the manual versions. Our study also had a quasi-experimental variable: the participants' cultural background. Participants could not be randomly assigned to these conditions, but belonged to them long before the research started.

We used a 3x2 experimental design, with participants' cultural background (Chinese living in China, Chinese living in the Netherlands, and Westerners) and manual structure as between-subject independent variables. Participants were randomly assigned to one of the two manual structures. Dependent variables were task performance, user satisfaction, and information selection. For the information selection, we collected eye-tracking data.

Data were collected in individual omnibus research sessions, in which we also collected data for two other experiments, about which we will report in separate articles. The tasks and stimulus materials used in the other two experiments differed considerably from those of this study, so that it was unlikely that they would influence each other. The research was approved by the ethical committee of our university. Below, we describe the various aspects of the research more in detail.

Software Package and Tasks

Just like an earlier study by De Jong et al. (2017), we chose Microsoft Excel 2016 as the software package for the experiment. Excel is a widely used spreadsheet application, embodied with several hundreds of features, from fundamental arithmetic calculations to rather complex programming. It is a software package

that many people are familiar with, while only few seem to master a broad range of its functionality. It is not hard to develop different assignments with Excel that range in difficulty and are suitable for lay software users (students, in our case).

We created four user tasks, with varying levels of difficulty, which had to be performed within 30 minutes:

- Task 1: Using the "fill handle" function to automatically fill out a short sequence of numbers (15, 13, 11, 9, 7, 5, 3, 1).
- Task 2: Ranking 999 cities according to their population, and adding a rank number using the "fill handle" function.
- Task 3: Using the "flash fill" function to create students' e-mail addresses based on their first names, last names, and e-mail service providers (sub task 1) and to extract their dates of birth from their ID card numbers (sub task 2).
- Task 4: Creating a "pivot table" based on a company's sales data given (sub task 1) and then providing an overview of a company's revenues per region in two subsequent years (sub task 2).

All four tasks were not in the realm of the widely familiar Excel operations, although their usefulness is easily recognizable for Excel users like the participants in our study. The first three tasks were relatively easy and could be accomplished with up to four actions; the fourth task was considerably more complex and time-consuming. We provided the participants with Excel files with the data needed to do the tasks.

Experimental Manipulation: Manual Versions

For this experiment, we designed a shortened Excel manual based on the information in the official manual (shortened because it only provided information about a small selection of the functionality of Excel). The manual consisted of the usual content elements of user instructions (procedural and declarative information, visuals) and was written following existing style guidelines. The instructions were offered on paper in a four-folding manual of eight pages. The first page contained a table of contents, copyright information, and disclaimers. The second page provided contextual information ("About this Guide" and an introduction of new functions in Excel 2016). The remaining six pages consisted of task-related instructions, all of which were relevant for the four tasks.

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We created four manual versions. For the experimental manipulation, we needed a variation in manual structure (Chinese versus Western). Given our participant groups, we needed two language versions of both. We did not want our results to be skewed by differences in English language proficiency, especially considering the group of Chinese participants residing in China. In the experiment, all Chinese participants worked with Chinese manual versions, and all Western participants worked with English manual versions.

For creating the two versions of the manual structure, we used the insights from the comprehensive content analysis by Li et al. (2020) as the starting point. As stated before, this content analysis was based on all earlier research into cultural differences between Chinese and Western documents, and tested for differences between the two cultures in a large sample of user manuals. This resulted in the following differences:

- The Chinese structure had a flatter structure than the Western one. All Western second-level headings were changed into first-level headings in the Chinese versions. All Western third- and fourth-level headings were removed in the Chinese structure.
- The headings in the Chinese structure (color, font size, and underlining) were marked with more visual cues than those in the Western one (color and font size).
- The Chinese manual structure was less chunked into procedural steps than the Western one. Numbered lists of steps were presented in normal body text, with three or more separate actions described in the same paragraph, and sometimes the same sentence.
- In contrast to the Western structure, the Chinese structure did not contain any standout elements such as tips and notes highlighted in a box. These types of information were integrated to the text.

Apart from these differences in structure, the content of the two manual versions was exactly the same. Examples of pages in both versions can be found in the Appendix.

The two versions of the manual were translated into Chinese by the first author. After that, the Chinese texts were translated back to English by a professional translator. A comparison of the original and back-translated English texts showed that they were consistent with each other.

Research Instrument and Measures

Regarding task performance, we used two measures: effectiveness (the proportion of the six tasks that were completed correctly) and efficiency (the total number of tasks completed successfully divided by the time taken).

Regarding user satisfaction, two measures were also used: satisfaction with the manual and satisfaction with the software package. Satisfaction with the manual was measured on five-point Likert scales (from strongly disagree to strongly agree) using 24 items based on Li et al. (2015). A factor analysis (with varimax rotation) showed that, after removal of confounding items, there were two underlying constructs: (1) satisfaction with the general usability of the manual (nine items; Cronbach's alpha = .90) and (2) satisfaction with the structure of the manual (four items; Cronbach's alpha = .84). Examples of items regarding general usability are: "The manual is of good quality" and "The manual was helpful for conducting the tasks." Examples of items regarding manual structure are "The structure of the manual is confusing" and "I could easily find the information I need in the manual."

Satisfaction with the software package was measured on five-point Likert scales (from strongly disagree to strongly agree) using eight of the 10 items of the System Usability Scale (SUS) (Brooke, 1996; Lewis & Sauro, 2009). Two items were removed from the scale because they did not fit in with the focus on limited functions of the software. We asked the SUS questions twice: for the first three tasks (all about filling in data) and for the fourth task (about the pivot table). Examples of items are: "I think that I would like to use the function frequently" and "I found this function was very awkward to use." Together, these items formed a sufficiently reliable scale (Cronbach's alpha = .85).

Participants' information selection was investigated by means of eye-tracking data. Eye-tracking is increasingly used to make sense of users' behaviors navigating texts or interfaces (Cooke, 2008, 2010; Elling et al., 2012). We used Tobii Pro Glasses 2, a mobile eye-tracker, to collect the eye-tracking data. Tobii Pro Glasses are worn like regular glasses and weigh only 45 grams. We concentrated on participants' information selection within the manual. Two measures were used: fixation counts (the number of fixations on parts of the manual) and fixation duration (the time used to process information around the fixations).

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To make sense of the eye-tracking data, we used the following measures:

- Total attention paid to the manual.
- Attention to structuring elements: (a) table of contents, (b) headings.
- Attention to contextual information.
- Attention to visuals versus text in the instructions.

Participants

Our study aimed at comparing Chinese and Western users' interactions with the two manual structures. To overcome a potential shortcoming of the Li et al. (2015) study, and at the same time test whether it really applied, we decided to include two groups of Chinese participants in our research: Chinese living in China, who were born and raised in China and had never been abroad, and Chinese living in the Netherlands, who had lived in Western countries for at least one year (on average 2.2 years). The Western participants were born and raised in Western Europe or North America and were currently living in the Netherlands. All participants were university students. Chinese participants spoke Mandarin as their first language and Western participants were English native speakers or were fluent in English. Participants were rewarded for participating in the study either with participant credits or a 5-euro compensation.

Overall, 158 students were recruited from a Chinese and a Dutch university. In recruiting participants, we tried to balance gender and the technical versus nontechnical orientation of their study program. Eventually, 31 participants had to be excluded from the analysis for one of the following reasons: problems with the completeness of the eye-tracking data (14), overlooking one or more of the tasks (14), and not using the manual (3). This resulted in 127 participants that were included in the final analysis.

Table 1 gives an overview of the participants' background characteristics per experimental condition. Overall, the female-male ratio (70:57) and the ratio between technical and nontechnical educational programs (67:60) appear to be more or less in balance. The participants' age ranged from 18 to 35 (M = 23.4, SD = 3.2).

Testing for possible differences in background characteristics between the experimental conditions, we did not find any differences regarding gender and program type. However, the participants' ages were not equally distributed. An analysis of variance showed significant differences for participants' cultural background ($F_{(2,121)} = 8.67$, $p < .001$) and manual structure conditions ($F_{(1,121)} = 4.52$, $p < .05$); no significant interaction effect was found ($F_{(2,121)} = 1.42$, $p = .25$). An LSD *post hoc* test showed that Chinese participants living in the Netherlands (M = 24.9) were on average older than Western participants (M = 23.2) and Chinese participants living in China (M = 22.3). To judge the potential consequences of these age differences, we examined the correlation between age and all dependent variables. The Pearson product-moment correlation coefficients appeared to be small and nonsignificant (ranging from -.14 to .14). Therefore we decided to analyze the results without age as a covariate.

Procedure

All data were collected in individual sessions. In the sessions, data for three separate experiments were

Table 1. Participants' background characteristics per experimental group

	Chinese in China		Chinese in the Netherlands		Westerners	
	Chinese manual structure	Western manual structure	Chinese manual structure	Western manual structure	Chinese manual structure	Western manual structure
N	25	20	21	20	19	22
Age (M, SD)	22.2 (2.6)	22.3 (2.6)	25.9 (2.1)	24.0 (2.7)	24.0 (2.2)	22.5 (2.6)
Gender (% female)	52%	60%	62%	45%	58%	55%
Program (% technical)	44%	60%	52%	55%	53%	55%

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collected. The session started with an experiment on the structure of declarative information (10–15 minutes). After that, the data for this experiment were collected (40–60 minutes). The session ended with an experiment on the appreciation of various types of visuals in manuals (5–15 minutes).

At the start of the session, participants were welcomed, and read and signed an informed consent form. The participants received a separate introduction for each of the experiments. When they were ready, they were asked to put on the Tobii Pro Glasses. After calibration of the eye-tracking device, the facilitator started the Tobii Pro Eye-Tracker Manager to record the participants' eye-movements.

The participants sat in front of a computer with the Excel program opened. They received a task sheet. When they indicated that they understood what to do, they were given their version of the user instructions. They all did the four tasks in the same order.

The recording was stopped when the participants had completed the four exercises or when the time ran out (after 30 minutes). After that, they were asked to fill out the online questionnaire about their satisfaction with the manual and the software.

Analysis

For the analysis of eye-tracking data, the software Tobii Pro Lab was used. The software can automatically map eye gaze data onto still images (snapshots) of real-world environments and objects of interest (in our case, the experimental manual). To analyze participants' fixations, areas of interests (AOI) in the manual were defined. All headings and all paragraphs were marked as areas of interest. Fixations outside of the AOI were not

counted. The automatic mapping was satisfactory, often accurate to the letter level. However, there were also instances of inaccurate mapping. To ensure correctness, the first author checked all mappings one by one and manually corrected misplaced mappings. All eye-movement data were imported in the same data file as the task performance and user satisfaction data.

The statistical analyses were conducted in SPSS. We used two-way analysis of variance, with LSD *post hoc* tests to further explore differences between the three cultural background groups. In our analyses, we were interested in the main effects of participants' cultural backgrounds, main effects of manual structure, and interaction effects between cultural background and manual structure.

RESULTS

Below, we describe the results per dependent variable. We start with task performance, followed by user satisfaction and information selection.

Task Performance

Table 2 provides an overview of the average task performance, subdivided into an effectiveness and an efficiency score, of the participants in all experimental conditions. Regarding *effectiveness,* participants in all conditions managed to complete between 79 and 88 percent of the tasks correctly. An analysis of variance showed that there were no significant differences between the three cultural groups (F (2,121) = 1.17, p = .31). Chinese participants living in China and abroad as well as Western participants performed equally well on the six tasks. Furthermore, there were no significant

Table 2. Task performance per experimental group

	Chinese in China		Chinese in the Netherlands		Westerners	
	Chinese manual structure	Western manual structure	Chinese manual structure	Western manual structure	Chinese manual structure	Western manual structure
N	25	20	21	20	19	22
Effectiveness	.79 (.24)	.80 (.27)	.88 (.19)	.85 (.23)	.82 (.16)	.88 (.22)
Efficiency	.23 (.14)	.26 (.13)	.29 (.17)	.26 (.11)	.26 (.09)	.28 (.14)

Note: All values represent mean scores (SD). Effectiveness is the proportion of correctly completed (sub) tasks; efficiency is the total number of correct (sub) tasks divided by the time taken (in minutes).

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differences between the two manual structures (F (1,121) = .06, p = .80). For the effectiveness of participants' task performance, it did not matter whether they used the Chinese or the Western manual structure. Finally, there was no interaction effect between participants' cultural background and the manual structure (F (2,121) = .38, p = .68).

Regarding *efficiency,* the findings are similar. Analysis of variance again showed no significant differences between the cultural groups (F (2,121) = .63, p = .54) and between manual structures (F (1,121) = .22, p = .64). Furthermore, no interaction effect between the two independent variables was found (F (2,121) = .49, p = .62). In all, the efficiency scores confirmed the conclusions drawn about effectiveness: All three groups of participants performed equally well, the manual structure did not make a difference, and there was no relationship between participants' cultural backgrounds and their efficiency working with either manual version.

In all, no support was found for our hypotheses that Chinese users work more effectively [H1a] and more efficiently [H2a] with the Chinese manual structure, and that Western users work more effectively [H1b] and more efficiently [H2b] with the Western manual structure.

User Satisfaction
Table 3 gives an overview of participants' user satisfaction scores per condition. Regarding *manual structure,* no significant differences were found between cultural groups (F (2,121) = .20, p = .82) and manual structures (F (1,121) = .73, p = .40). There was

also no interaction effect between the two independent variables (F (2,121) = 1.00, p = .37).

Similar results were found regarding *manual usability:* There were no significant differences between cultural groups (F (2,121) = 1.66, p = .19) and between manual structures (F (1,121) = .58, p = .45), and no interaction effect was found (F (2,121) = 2.33, p = .10).

Participants' satisfaction scores for *software functionality* also did not show significant differences between the experimental conditions. No main effects were found of cultural groups (F (2,121) = .49, p = .61) and manual structure (F (1,121) = .46, p = .50), and no interaction effect between the two was found (F (2,121) = .23, p = .10).

In all, our findings provide no support for the hypotheses that Chinese users are more satisfied with the manual structure [H3a], the manual's usability [H4a], and the software [H5a] when working with the Chinese manual structure. Likewise, there is no support for the hypotheses that Western users are more satisfied with the manual structure [H3b], the manual's usability [H4b] and the software [H5b] when working with the Western manual structure.

Information Selection
Tables 4 and 5 present the findings regarding participants' information selection, subdivided into their fixation counts and their fixation duration, in all experimental conditions.

Overall attention to the manual
In our analysis, we first focused on the overall attention participants paid to the manual, as indicated by

Table 3. User satisfaction scores per experimental group

	Chinese in China		Chinese in the Netherlands		Westerners	
	Chinese manual structure	Western manual structure	Chinese manual structure	Western manual structure	Chinese manual structure	Western manual structure
N	25	20	21	20	19	22
Manual structure	4.29 (.42)	4.11 (.83)	4.42 (.56)	4.16 (.54)	4.16 (.83)	4.29 (.62)
Manual usability	3.66 (.86)	4.08 (.54)	3.94 (.70)	3.73 (.73)	4.05 (.44)	4.11 (.60)
Software functions	3.55 (.45)	3.88 (.63)	3.81 (.44)	3.67 (.42)	3.82 (.49)	3.83 (.65)

Note: All values represent mean scores (SD). Measured on five-point scales (1 = negative, 5 = positive).

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Table 4. Information selection (fixation counts) per experimental group

	Chinese in China		Chinese in the Netherlands		Westerners	
	Chinese manual structure	Western manual structure	Chinese manual structure	Western manual structure	Chinese manual structure	Western manual structure
N	25	20	21	20	19	22
Total fixation counts	600.3 (301.0)	584.1 (289.3)	653.8 (252.1)	557.2 (210.8)	551.2 (188.5)	493.73 (224.1)
Attention to structuring elements						
Table of contents	8.6 (8.4)	11.9 (20.4)	15.2 (17.3)	11.6 (7.4)	47.3 (24.4)	33.0 (20.6)
Headings	20.6 (15.7)	15.9 (11.0)	37.2 (29.9)	16.1 (8.5)	39.1 (27.1)	25.8 (14.4)
Attention to contextual information						
Contextual information (page 2)	9.9 (5.7)	10.0 (11.0)	21.6 (23.8)	9.3 (5.9)	26.7 (22.7)	34.3 (25.2)
Attention to visuals vs. text						
Visuals in instructions	164.1 (96.1)	174.9 (90.5)	179.6 (72.1)	165.1 (73.8)	113.1 (37.4)	125.6 (60.5)
Text in instructions	414.9 (210.0)	384.2 (196.2)	432.7 (169.9)	368.8 (145.1)	362.1 (135.6)	285.1 (134.1)

Table 5. Information selection (fixation duration) per experimental group

	Chinese in China		Chinese in the Netherlands		Westerners	
	Chinese manual structure	Western manual structure	Chinese manual structure	Western manual structure	Chinese manual structure	Western manual structure
N	25	20	21	20	19	22
Total fixation duration	276.2 (133.2)	231.6 (118.1)	282.2 (111.1)	254.1 (144.4)	330.9 (129.1)	295.7 (118.4)
Attention to structuring elements						
Table of contents	6.6 (6.0)	5.2 (9.0)	9.3 (8.0)	5.8 (4.8)	27.1 (18.0)	19.0 (11.7)
Headings	8.3 (7.9)	5.6 (5.6)	15.1 (13.2)	6.5 (4.3)	18.8 (16.6)	14.5 (8.4)
Attention to contextual information						
Contextual information (page 2)	3.4 (3.6)	2.7 (3.0)	6.9 (9.2)	2.7 (2.0)	16.8 (15.8)	20.3 (14.5)
Attention to visuals versus text						
Visuals in instructions	73.0 (41.1)	69.6 (33.9)	74.6 (31.3)	70.4 (38.9)	58.7 (24.5)	71.4 (32.6)
Text in instructions	192.2 (98.3)	153.3 (83.0)	189.8 (77.7)	174.5 (109.6)	227.5 (91.8)	174.8 (77.2)

Note: Fixation duration is measured in seconds

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the total number of fixation counts and the total fixation duration. Analyses of variances did not show any significant main or interaction effects of the experimental conditions. On average, participants paid attention to the manual for 278 seconds (4.6 minutes), ranging between 40 and 709 seconds (11.8 minutes).

Attention to structuring elements

Looking at participants' attention for the structuring elements in the manual, we found a number of significant differences. Regarding the **usage of the table of contents,** participants' fixation counts (F $(2,121) = 37.44$, $p < .001$, partial $\eta^2 = .38$) and their fixation duration (F $(2,121) = 36.48$, $p < .001$, partial $\eta^2 = .38$) indicated a strong and significant difference between the cultural groups. LSD *post hoc* tests showed that Western participants consulted the table of contents more often and longer than both groups of Chinese participants. In addition, the fixation duration showed a significant difference between the manual versions (F $(1,121) = 5.98$, $p < .05$, partial $\eta^2 = .05$): Participants working with the Chinese manual structure used the table of contents longer than participants working with the Western manual structure. This may be due to the less explicit structure within the instructions themselves. We did not find a similar effect for fixation counts (F $(1,121) = 2.46$, $p = .12$). No interaction effect was found.

Regarding the **usage of headings,** the fixation counts (F $(2.121) = 5.82$, $p < .005$, partial $\eta^2 = .09$) and fixation duration (F $(1,121) = 9.87$, $p < .005$, partial $\eta^2 = .14$) again showed a significant difference between the cultural groups. For both measures, LSD *post hoc* tests suggest that Western participants used headings more and longer than Chinese participants living in China. The Chinese participants living in the Netherlands took a middle position: They differed significantly from the Chinese living in China for fixation counts, and differed significantly from the Western participants for fixation duration. Furthermore, the fixation counts (F $(1,121) = 5.82$, $p < .001$, partial $\eta^2 = .11$) and the fixation duration (F $(1,121) = 8.32$, $p < .01$, partial $\eta^2 = .06$) showed that there was also an effect of manual structure: The Chinese manual version urged participants more to pay attention to headings than the Western version did. This might have been caused by an upgrading of second-level headings (which resembled frst-level headings in the Chinese manual version)

and the more emphasized layout of the headings. No interaction effect was found.

These findings support our hypothesis that Chinese participants pay less attention to the table of contents [H6] and headings [H7] than Western participants. At the same time, our findings draw attention to an effect we did not expect: The Chinese manual structure simulated participants more to pay attention to the table of contents and headings than the Western manual structure. A possible explanation for this finding is that participants working with the more implicit and less chunked Chinese manual structure were looking for more guidance during the process.

Attention to contextual information

An analysis of the attention paid to contextual information revealed differences in the opposite direction than expected. Participants' fixation counts (F $(2,121) = 15.27$, $p < .001$, partial $\eta^2 = .20$) and fixation duration (F $(2,121) = 32.37$, $p < .001$, partial $\eta^2 = .35$) indicated a strong and significant difference between the cultural groups. Contrary to our expectations, LSD *post hoc* tests showed that Western participants paid significantly more attention to this type of information than both groups of Chinese participants. There were no effects of manual structure, neither for fixation counts (F $(1,121) = .24$, $p = .62$) nor for fixation duration (F $(1,121) = .07$, $p = .79$). Participants' fixation counts, however, showed a significant interaction effect between the cultural groups and the manual structure (F $(2,121) = 3.33$, $p < .05$, partial $\eta^2 = .05$). An LSD *post hoc* test revealed that Western participants were more inclined to read contextual information in the Western manual structure (34.3 versus 26.7), whereas Chinese participants living in the Netherlands tended to read more contextual information in the Chinese manual structure (21.6 versus 9.3). There was no interaction effect for fixation duration.

These findings do not support our hypothesis regarding attention to contextual versus task-related information. We expected Chinese participants to pay more attention to contextual information than Western participants [H8], but they appeared to focus less on the contextual information. An explanation for this unexpected finding might be that Chinese users are more used to the presence of non-instrumental elements in a manual and know what to expect from them. Li et al. (2020) showed that non-instrumental

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elements are more common in Chinese manuals than in Western ones, especially in the introductory parts. When confronted with assignments that solely focus on task execution, Chinese participants may have felt more confident to set the contextual information aside, whereas Western participants, being used to the overall instrumental content of manuals, may have felt less confidence to skip these introductory passages.

The interaction effect found for fixation counts—with Western participants focusing more on contextual information in the Western manual structure, and Chinese participants living in the Netherlands focusing more on contextual information in the Chinese manual structure—is harder to explain. It is imaginable that participants working with the manual structure connecting to their own culture were more positive of the quality of the manual and therefore had higher expectations of the usefulness of the contextual information. It seems not unlikely that this only affected the Chinese participants living in the Netherlands—who had been exposed to user instructions from both cultures—and not the Chinese participants living in China—who know from experience that contextual information in manuals is never relevant for task execution.

Attention to visuals versus text

An analysis of the fixation counts of **attention to visuals** showed that there was a significant difference between the cultural groups ($F_{(2,121)} = 6.47$, $p < .005$, partial $\eta^2 = .10$). An LSD *post hoc* test showed that both groups of Chinese participants paid significantly more attention to the visuals than the Western participants did. We did not find a significant difference at this point for fixation duration ($F_{(2,121)} = .55$, $p = .58$). We also did not find significant differences of manual structure, neither for fixation counts ($F_{(1,121)} = .05$, $p = .83$) nor for fixation duration ($F_{(1,121)} = .08$, $p = .78$). No interaction effect was found.

Regarding participants' **attention to text,** no significant differences were found between the cultural groups, both in fixation counts ($F_{(2,121)} = 2.82$, $p = .06$) and in fixation duration ($F_{(2,121)} = 1.08$, $p = .34$). One could say that there is a tendency towards significance regarding fixation counts, but the difference is in the opposite direction than expected: Chinese participants tended to have more fixations on text than Western participants. However, manual structure

appeared to matter. We found a tendency towards significance for fixation counts ($F_{(1,121)} = 3.59$, $p = .06$, partial $\eta^2 = .03$) and a significant difference for fixation duration ($F_{(1,121)} = 4.90$, $p < .05$, partial $\eta^2 = .04$). The Chinese manual structure appeared to focus participants' attention more on the text than the Western manual structure. No interaction effect was found.

These findings provide partial support for the hypothesis that Chinese users pay more attention to visuals than Western users [H9]. This was confirmed for fixation counts but not for fixation duration. No support was found for the hypothesis that Chinese users pay less attention to text than Western users [H10].

The finding that the Chinese manual structure focuses participants more on the textual instructions can be explained by the fact that the less explicit structure with fewer standout elements may require that users read more text to find the information they are looking for.

DISCUSSION

Main Findings
As a follow-up to the study by Li et al. (2015), the research reported in this article is a second attempt to investigate whether culturally adapted manual structures would make a difference for Chinese and Western users. To answer this question, we created a Chinese and a Western version of a manual based on current insights from content analytic studies and tested how these versions worked for Chinese and Western users. In the research design, we tried to overcome the shortcomings of the earlier study by Li et al. (2015). Nevertheless, the results of our study were perfectly in line with Li et al.'s earlier findings: The structural differences between the two manual versions had no effect on Chinese and Western users. All hypotheses regarding task performance [H1-2] and user satisfaction [H3-5] had to be rejected.

Looking at participants' information selection, our study resulted in a number of interesting observations, mostly in line with our hypotheses, but one time in the opposite direction. Our results confirmed our hypotheses that Chinese users make less use of structuring elements in a manual (the table of contents and headings) than Western users [H6-7]. We also found partial confirmation for our hypothesis that Chinese users pay more attention to visuals than

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Western users [H9], but did not find confirmation of the counterpart of the latter hypothesis, that Western users pay more attention to textual information than Chinese participants [H10]

The observation in the opposite direction involved the use of contextual information [H8]. On the basis of the content analytic studies, we expected that Chinese users would use contextual information more than Western users. In our study, however, Chinese users appeared to use this type of information less than Western users. The explanation seems to lie in the strict task orientation of our experiment. In line with the cultural differences found in content analyses, Chinese users might have known, based on earlier experiences with manuals, that this part of the manual would not contain useful information for their tasks. Western users, who tend to see the entire manual as a document aimed at supporting users to work with the software, may have had higher expectations of the potential usefulness of the contextual information.

Theoretical and Methodological Implications

Our research contributes to the body of knowledge regarding cross-cultural and intercultural technical communication. The main issue at stake here is whether the insights that have been developed in content analytic research about cultural differences in the structuring of user manuals (Barnum & Li, 2006; Ding, 2003; Dragga, 1999; Li et al., 2020; J. Wang, 2007; Q. Wang, 2000; Y. Wang, & Wang, 2009; Yu, 2009) actually reflect cultural differences in user preferences. If that would not be the case, such differences must be ascribed to local folklore and random habits of technical communicators.

Our research provides a mixed answer to that question. On the one hand, our results seem to relativize the importance of cultural differences in the structuring of user instructions. Our study showed that implementing the structural differences identified in content analyses does not make a noticeable difference to users. Chinese users can work equally well and are equally satisfied with a Western and a Chinese manual structure. And the same applies to Western users. The latter is surprising because the Western manual structure was meant to reflect the current (Western) state of the art in structuring user instructions, and the Chinese structure deviates from some basic principles

(creating a clear hierarchical structure, chunking information, making certain elements stand out).

On the other hand, our results indicate that Chinese and Western users differ in their way of using manuals. And these differences appear to correspond to structural and other differences uncovered in content analytic research (Li et al., 2020). For instance, Chinese users pay less attention to the structuring elements than Western users, which somehow supports the looser and less rigid structuring of Chinese manuals. Chinese users pay more attention to visuals in the manual, which corroborates earlier findings about the prominence of visuals in Chinese technical communication. And Chinese users expect more than Western users that contextual information is not task-related, which supports the more multifunctional nature of Chinese manuals.

How do these paradoxical insights align with each other? Li et al. (2015) proposed the existence of a "community of practice" in the domain of user support, in which a more or less universal way of designing and using instructions emerges (cf. Eckert, 2006). Our results seem to further specify that. There are differences in the way Chinese and Western users operate using instructions, but at the same time, Chinese and Western users have developed flexibility in using instructions that enables them to work equally well with different cultural versions. This might indicate that the structuring of manuals can be seen as a less prominent aspect of cross-cultural technical communication than previously assumed.

Methodologically, we wanted to find out whether recruiting Chinese participants living in Western countries, like Li et al. (2015) did, leads to comparable results as recruiting Chinese participants living in China. This relates to the effects of acculturation on cultural differences. We only found one instance in which Chinese participants living in the Netherlands took a middle position between Chinese participants living in China and Western participants. In all other differences found, the two groups of Chinese participants did not differ from each other. Our findings thus did not provide convincing evidence that it is problematic to conduct cross-cultural technical communication research with participants residing in Western countries. Intrinsically, our results suggest that cultural differences in using user instructions can be quite resistant to the effects of acculturation.

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Practical Recommendations

Based on our findings, it does not seem justified to spend much time and effort on cultural adaptations of a manual structure. Other aspects of a manual seem to be more promising to make a difference for the usability and user experience of international users. One aspect appears to be the use of visuals. Our research shows that visuals are more important to Chinese users than to Western users. In design processes of individual manuals or of a format for manuals, it would be wise to pay attention to the differential role visuals can play in the perceived quality and usability of a manual. Another aspect involves content, particularly the way manuals may contribute to the relation between brand and user and to user experience in general. Our findings underline that Chinese users have different expectations at this point than Western users.

Limitations and Suggestions for Future Research

Of course, there are limitations that should be kept in mind when interpreting our results. First, it must be acknowledged that the participants in our research were all students. There was a match between participants and software package—students often use Excel for various purposes—but the user group of Excel tends to be broader: It is likely that professionals in the workplace, older people, and people with lower levels of education also use the package. For the purpose of an experimental comparison, a certain degree of homogeneity in the sample is beneficial, as uncovering differences between groups is more feasible when the diversity within groups is limited. For the external validity of the findings, it would be helpful if the research could be replicated within other relevant cross sections in society. One could expect that professionals in the workplace might even have more flexibility in working with the software and the instructions whereas cultural differences might be more prominent among older users and users with lower levels of education.

Second, one could argue that the structural characteristics of manuals will play a more significant role when the document is more substantial. Our study ensured that the manual was sufficiently complex and that participants really used it, but the manual was still relatively short, basically an excerpt from a more comprehensive Excel manual. It is imaginable that the effects of structure, and as a consequence the possible effects of cultural variations of structure, will be clearer in the case of a more substantial manual. Future research could focus on that.

Third, our research only focused on immediate task performance, whereas using the manual may also involve learning and memorizing how to perform certain tasks (reading to learn to do; Redish, 1989). Earlier research shows that manipulations in user instructions might have no effect on immediate task performance and still have an effect on learning and future (memorized) task performance (Eiriksdottir & Catrambone, 2011; Ummelen, 1997). Future research could therefore also focus on the effects of manual structures on learning and future task performance.

Fourth, our experiment was entirely focused on task execution, which relates to the usability of manuals, but leaves out other types of contributions a manual might make, specifically in the broader realm of user experience. Especially with regard to the information selection of users in a manual, it would be very interesting to take a broader perspective on the use of manuals. Our strict focus on usability might be an example of cultural bias in itself. More eye-tracking studies of participants using a manual for a broader range of tasks than immediate task performance would be very interesting.

Fifth, we positioned our research as a comparison of Chinese and Western user instructions, but the labels "Chinese" and "Western" might be too generic. The Western world consists of many different countries and we can by no means be sure that all these countries are culturally homogeneous. Similarly, China is a huge country that may also have differences between different parts. At the same time, it could be argued that the label "Chinese" is too limited, as other East Asian countries (e.g., Korea or Japan) might favor the same structuring principles and might show similar user behaviors. Future research could shed more light on these issues.

A sixth limitation involves the role of translation in our research. We believe we had good reasons to work with two language versions of the instructions. Despite our precautions in developing the translated versions, the quality of the translations might have influenced the results. We cannot be completely sure whether the two Chinese manual versions were of equal quality as the two English versions. More research into the role of technical translation is needed. One can think of a

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larger project in which translation quality is added as an extra factor. It would also be interesting to investigate in detail how technical translators deal with the structural aspects of user instructions, both in terms of their end products and in terms of their considerations.

Finally, our findings call for more meticulous empirical research into the effects of (combinations of) structuring approaches and elements in both cultures. Carefully and explicitly structuring instructions can be seen as one of the cornerstones of technical communication. Our findings seem to relativize the importance of the two packages of structuring principles. Based on these somewhat puzzling results, it would be relevant to find out which combinations of structuring approaches and elements are vital for the usability of instructions, and which approaches and elements may be redundant. Ideally, such results would make the connection between the various structuring elements and approaches and the user behavior of Chinese and Western users. More fine-grained eye-tracking data could be helpful in this respect.

CONCLUSION

The study reported in this article shows that cultural adaptations of the structuring of a user manual do not have the expected effects on Chinese and Western participants. Both groups of participants perform equally well and are equally satisfied with both manual structures. This does not mean that they behave in the same way. Chinese users pay less attention to structuring elements (table of contents and headings) and more attention to visuals. These differences appear to correspond to some of the insights content-analytic studies have provided about differences between Chinese and Western documents. Task performance and satisfaction scores suggest that Chinese and Western users have the flexibility to use a manual version that does not correspond to the principles of structuring belonging to their culture. In this respect, the structure of user instructions may not be an urgent aspect to pay attention to in cross-cultural technical communication.

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APPENDIX: EXAMPLES OF PAGES OF THE TWO MANUAL STRUCTURES
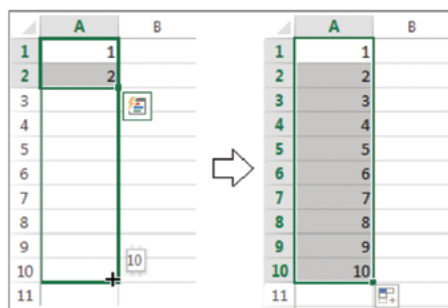

Filling data automatically

Instead of entering data manually on a worksheet, you can fill data automatically with the fill handle function and the flash fill function.

Filling data by dragging the fill handle

To quickly fill in several types of data series, you can select cells and drag the fill handle ⬚. For example, if you want a series: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, do the followings:

Type the starting value 1 for the series in cell A1, type the value 2 in cell A2 to establish a pattern, and select the cells A1 and A2 that contain the starting values. Drag the fill handle ⬚ cross or down to cell A10 and release it. Note that drag the the fill handle only when the pointer changes from ✛ to ✚. To fill in an increasing order, drag down or to the right. To fill in a decreasing order, drag up or to the left.
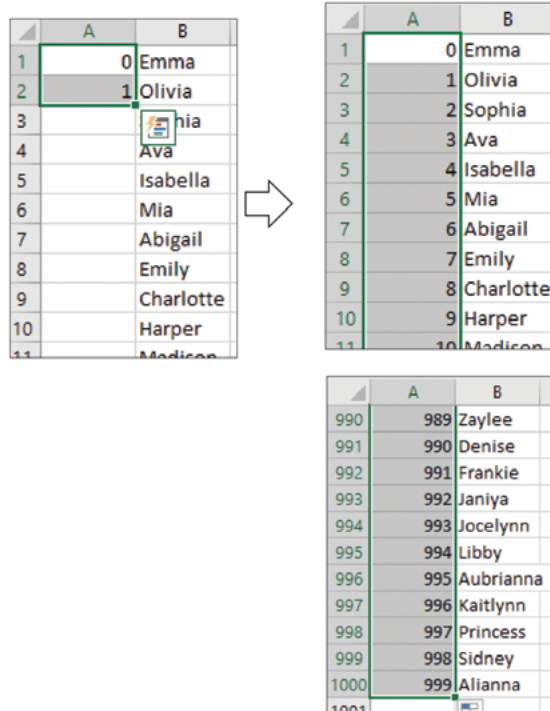
Filling data by double-clicking the fill handle

Filling data by double-clicking the fill handle is useful especially if you need to fill in a huge number of cells. For example, suppose column B contains names for 1000 participants in a relay race, and you want to create race numbers for them from 0 to 999, do the following:

Type the starting value 0 in cell A1 for the series, type the value 1 in cell A2 to establish a pattern, and select the cells A1 and A2 that contain the starting values. Double click the fill hand ⬚, and the formula will repeat to the end of the data. Note that Double click the fill handle only when the pointer changes from ✛ to ✚.

Figure 1. First two pages of the Chinese manual structure (English language version)

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Filling data automatically

Instead of entering data manually on a worksheet, you can fill data automatically with the fill handle function and the flash fill function.
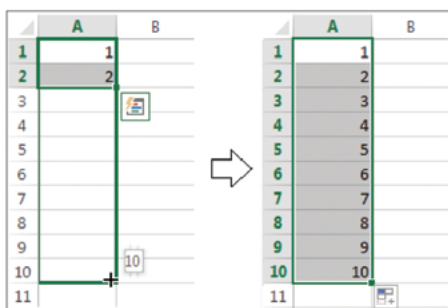
Filling data by dragging the fill handle

To quickly fill in several types of data series, you can select cells and drag the fill handle [⬚].

Example

If you want a series: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, do the followings:

1. Type the starting value 1 for the series in cell A1.

2. Type the value 2 in cell A2 to establish a pattern.

3. Select the cells A1 and A2 that contain the starting values.

4. Drag the fill handle [⬚] cross or down to cell A10 and release it.

> **Note:** Drag the fill handle only when the pointer changes from ✛ to +.

> **Tip:** To fill in an increasing order, drag down or to the right. To fill in a decreasing order, drag up or to the left.

Filling data by double-clicking the fill handle
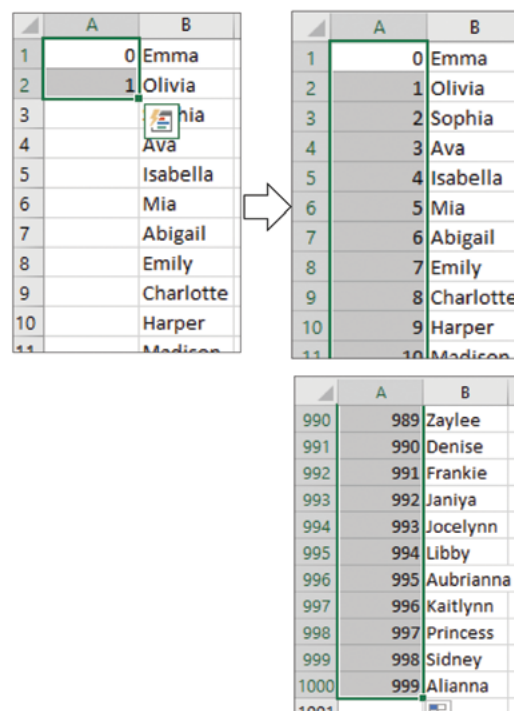
Filling data by double-clicking the fill handle is useful especially if you need to fill in a huge number of cells.

Example

Suppose column B contains names for 1000 participants in a relay race, and you want to create race numbers for them from 0 to 999, do the following:

1. Type the starting value 0 in cell A1 for the series.

2. Type the value 1 in cell A2 to establish a pattern.

3. Select the cells A1 and A2 that contain the starting values.

4. Double click the fill hand [⬚], and the formula will repeat to the end of the data.

> **Note:** Double click the fill handle only when the pointer changes from ✛ to +.

Figure 2. First two pages of the Western manual structure (English language version)

The Prevalence and Utility of Formal Features in Screen-Capture Tutorial Videos

By Christopher Brett Jaeger, Joshua Little, and Daniel T. Levin

ABSTRACT

Purpose: Screen-capture video is an increasingly popular vehicle for communicating information online. We posit that screen-capture video represents a distinct genre of technical communication, which leverages a specific set of formal features to communicate information to viewers. We propose and evaluate an initial catalog of formal features, grouping them in four categories: attention cues, segmentation cues, content features, and vocal performance.

Method: To evaluate our catalog, we completed a systematic survey of the features of 200 screen-capture tutorial videos from YouTube.

Results: We found that many of the features in our catalog are already being leveraged by screen-capture creators and, further, that use of these features is correlated with video viewership.

Conclusion: We provide a practical catalog of formal features that screen-capture creators use to effectively convey information to viewers, and demonstrate that these features are predictive of video viewership. Further, our results suggest that certain features, like vocal performance and segmentation cues, are especially predictive of viewership.

KEYWORDS: screencast, screen-capture video, tutorial, online communication, attention

Practitioner's Takeaway:

- The catalog of formal features we describe is a resource for authors creating instructional screen-capture videos and for researchers investigating those videos' effectiveness.
- Authors of instructional screen-capture videos should pay special attention to vocal expressiveness and disfluencies, to their use of mouse movements and "gestures" to guide visual attention, and to their use of segmentation cues to break content up for viewers.
- Many screen-capture videos do not include vocal narration, and, for these videos, the authors' use of attention and segmentation cues may be especially important.

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INTRODUCTION

Screen-capture video is an increasingly common vehicle for communicating technical information online (Morain & Swarts, 2012; Selber, 2010). Screen-capture videos, sometimes called "screencasts," are digital recordings of the output displayed on a computer screen, often accompanied by vocal narration (Udell, 2004; Oxford English Dictionary, 2018). Screen-capture videos are a staple of online education: Teachers frequently screen-capture PowerPoint slides accompanying lectures or illustrate problems using an interactive whiteboard. Screen-capture videos are also frequently used in less formal instruction. This article focuses on screen-capture tutorials, a subset of screen-capture videos in which an instructor demonstrates uses or features of a software application for viewers. On YouTube, screen-capture tutorials are finding vast audiences for applications ranging from word processing to video editing.

But what attributes make for an effective screen-capture tutorial? To tackle this question, it is helpful to consider the basic features and structural principles that are available to, and used by, screencast authors. It is difficult to assess the qualities that differentiate effective screen-capture tutorials from less effective ones without first understanding the array of formal features that authors use to communicate information to viewers.

In this paper, we offer a psychologically grounded framework for understanding the formal features of screen-capture tutorials. Drawing upon research in cognitive science, technical communication, and cinema, our framework includes four categories of features: attention cues, segmentation cues, content features, and vocal performance. We then present data from a survey of 200 instructional screencasts from YouTube, assessing their use of features in these categories and statistically evaluating the degree to which these features predict video viewership.

BACKGROUND

Research on Online Instructional Videos

In recent years, researchers across a variety of fields have shown increased interest in online instructional videos, including—but not limited to—screencasts (e.g., Morain & Swarts, 2012; Selber, 2010; Giannakos, 2013; Ritzhaupt et al., 2015). Some researchers have cataloged properties of online instructional videos in specific content domains. For example, Chan, Choo, and Woods (2013) searched YouTube for "principles of animation" and noted that the search results included live lectures (i.e., videos of an instructor speaking), screen-capture demonstrations, and "mash-ups," and that almost all of the videos were accompanied by audio. The researchers concluded that YouTube provided animation students with a wide variety of animation-related videos, but that most of the videos were exemplars that would be of limited use to students who did not already have a basic understanding of animation principles. Tewell (2010) surveyed 1,070 online tutorial videos produced by libraries for visual arts students, finding that the majority of such videos (778) were screencasts. Tewell reported that the videos tended to be brief, averaging approximately 4 minutes in duration, and typically addressed topics suitable for step-by-step instruction such as database search strategies.

Other researchers have studied the preferences of viewers of online instructional videos, using a variety of methods for assessing viewer preferences. For example, Guo, Kim, and Rubin (2014) examined how video features related to viewer engagement (i.e., watch time) using data from the edX MOOC (massive open online course) platform. The best predictor of engagement was video length, with students watching a greater portion of shorter videos. Specifically, students' engagement dropped off in videos longer than 12 minutes: Students' median engagement time hovered around 6 minutes for videos between 6 and 12 minutes in length, but fell to less than 4 minutes for videos more than 12 minutes in length. Guo, Kim, and Rubin also found that students engaged longer with videos in which the instructor spoke rapidly (faster than 185 wpm). In another study, ten Hove and van der Meij (2015) surveyed the physical design characteristics (e.g., resolution, use of on-screen text) of a sample of 75 instructional videos on YouTube, identifying a variety of differences in these characteristics across video popularity classes (e.g., more popular videos tended to be higher resolution and include more on-screen texts, among other things).

Morain and Swarts (2012) conducted a descriptive study of 46 user-rated screen-capture tutorials and developed a rubric for assessing their instructional content, noting certain characteristics common to highly rated, poorly rated, and average videos. Some other researchers have examined relations between

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instructional video features and viewer preferences by soliciting post-video feedback from viewers or testing content learning (Ritzhaupt et al., 2008; Cross et al., 2013; Ilioudi et al., 2013). Growing interest in the relation between the properties of online tutorial videos and viewer preferences has yielded valuable rubrics and "best practice" guidelines for instructors (e.g., Morain & Swarts, 2012; Swarts, 2012; Sugar et al., 2010; Pflugfelder, 2013). Recently, Chong (2018) surveyed the ten most-viewed beauty tutorials on YouTube and found that a majority of those videos followed best practices suggested by Swarts (2012).

This paper presents a survey of YouTube screen-capture tutorials that contributes to the existing literature in three ways. First, this paper focuses exclusively on *screen-capture tutorials*. As the screen-capture tutorial continues to grow in popularity, we aim to identify central formal features that define the genre—features that authors might leverage to improve communication. We discuss these features in the next section and use them to structure our survey. Second, this paper statistically examines the relation between formal features of screen-capture tutorials and the number of views they get on YouTube, identifying the types of features that are most predictive of viewership. Third, our survey includes 200 videos, making it, to our knowledge, the largest survey to date of screen-capture tutorials on YouTube.

Screen-Capture as a Distinct Genre

Screen-capture video dates to the 1990's, when companies like TechSmith (developer of SnagIt and Camtasia) and IBM/Lotus (developer of ScreenCam) pioneered the technology (Williams & Goodwin, 2007; TechSmith, 2018). As increasingly widespread broadband internet access facilitated distribution of screen-capture videos, an online community interested in the genre developed. Indeed, the term *screencast* originated when a blog post by journalist Jon Udell asked readers what he should call the developing genre (Udell, 2004; Williams & Goodwin, 2007). Screen-capture software tutorials have become a common tool for users who want to learn new software features and for companies training employees with challenging software.

The premise of this article is that screen-capture videos can be usefully understood as a distinct genre of communication: "Genres are identified both by their

socially recognized communicative purpose and by common characteristics of the form" (Yates et al., 1997; for useful discussions of genre, see Henze, 2012; Miller, 1984). Communication within a particular genre often uses a set of associated formal features to help communicators convey, and viewers understand and interpret, content (Getto et al., 2011).

For example, in the early 20th century, DW Griffith developed the core formal features that define cinema as a genre (Slide, 2012). He did so by carefully observing how his audiences responded to his films, then iteratively tailoring the films based on his observations. Ultimately, this produced a set of principles of editing that filmmakers still use to shape viewers' cognition for desired effect (e.g., the use of a close-up to accentuate a dramatic moment). Collectively, these practices constitute a set of structural principles that support both perceptual continuity and conceptual integration of meaning by using broadly applicable visual cues that interact with meaningful events (for review see Smith et al., 2012; Levin & Baker, 2017).

Screen-capture authors share many functional goals with filmmakers. For example, like filmmakers, screen-capture authors need to direct viewer attention to important objects, properties, and concepts. But screen-capture authors have more limited visual tools at their disposal to achieve these goals, as the video component of screencasts typically consists of output from a single computer screen. Thus, authors have been forced to devise new methods for using the limited set of tools at their disposal to shape viewers' cognition in support of communication. We suggest that one potentially fruitful way to analyze screen-capture video is by treating it as a unique genre with its own distinct set of formal features.

Existing literature in technical communication and cognitive science suggest that certain types of formal features might be especially important in orienting the attention of screencast viewers, both to on-screen events and to meaningful internal representations that viewers build as they integrate information from the screencast. Drawing on the existing literature, we identify four categories of formal features of screencasts: attention cues, segmentation cues, content features, and vocal performance. In the following paragraphs, we define each category and relate it to existing research, flagging links between categories of formal features and basic cognitive skills used in viewing screen-capture tutorials.

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We list particular formal features in each of our four categories later in the paper.

Attention cues

When we refer to attention cues, we mean methods for directing viewers' visuospatial attention. Filmmakers frequently use the gaze of on-screen individuals to cue viewers' attention. Humans track, follow, and interpret the gaze of others, often by default (Butterworth & Jarrett, 1991; Moll & Tomasello, 2004; Samson et al., 2010; Baker et al., 2016), and filmmakers exploit this tendency by using the gaze of people on-screen to direct the viewer's attention to the important part of a scene (Levin & Baker, 2017). But without people onscreen, screen-capture authors must use other cues to direct visuospatial attention. These other cues might include clicking and dragging to highlight areas of interest on the screen or circling those areas with the cursor. Further, screen-capture authors might communicate information typically conveyed by hand gestures in the physical world through analogous 'gestures' with on-screen objects, such as the cursor.

Segmentation cues

Research suggests that viewers will best understand and remember video content if they can organize it within a coherent event structure (Zacks et al., 2007; Zacks et al., 2010). When researchers ask participants to segment videos into discrete events (for example, by pressing the space bar when a new event begins), they find that "better" event segmentation (i.e., segmentation more in line with other participants' segmentation) predicts better subsequent memory for the videos' contents (Sargent et al., 2013; Bailey et al., 2013; Kurby & Zacks, 2011). Viewers are also more likely to notice changes to objects and properties in videos at event boundaries (Baker & Levin, 2015), while encoding of details within an event can be surprisingly sparse (Levin & Varakin, 2004). These findings suggest that providing clear event structure—for example, by visually or verbally marking breaks between steps in a sequence—can help filmmakers convey information in a way that viewers will remember. But it can be difficult to provide clean, coherent event boundaries in screencasts, since they conventionally lack cinema-style edits (e.g., cuts between scenes). However, screencast creators have devised some cues that can be used to create clearer event structure. For instance, creators can use the appearance of on-screen text to signify the beginning of a new event, or use "fast-forward" effects or "fades" to separate and highlight the critical steps in a procedure. By using these cues, screencast creators might help viewers segment the video into meaningful steps or units and, consequently, facilitate understanding.

Content features

The way content is structured in screencasts can vary in a number of ways (Morain & Swarts, 2012). For example, some videos use introductions and closings to structure content, while others do not (Tewell, 2010). Some explicitly state learning objectives at the outset, often through the use of nonspatial text (e.g., text superimposed on the screen-capture for purposes other than labeling on-screen objects) (Chong, 2018; Swarts, 2012). Some screencast tutorials even show footage of the author talking before or after screen-capture components to provide context. The choices that authors make in structuring their instructional content will inevitably influence viewers' cognition (Mayer, 2002), just as the ways in which filmmakers choose to structure their narratives (e.g., through heavy foreshadowing or by combining action with voiceover) influences audience experience.

Vocal performance

Viewers usually do not see content creators during screencasts, but content creators frequently provide vocal narration of the actions. Because this off-screen narration often plays a critical role in guiding viewers' attention and providing context for on-screen actions, aspects of the narrator's vocal performance might be especially important for effective communication (Mohamad Ali et al., 2011). Relevant aspects might include the narrator's enthusiasm, speech rate, vocal expressiveness, and fluidity. Guo, Kim, and Rubin (2014) found that, in the context of MOOC videos, the speaker's rate of speech—which they interpreted as a proxy for enthusiasm level—was predictive of viewer engagement.

In this paper, we use the preceding four categories to create and organize a catalog of formal features of screen-capture tutorials (presented in the Method section). We then survey 200 instructional screencasts from YouTube and assess the degree to which they used features falling within our categories. We report the prevalence of formal features in each category, then

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investigate how the use of formal features relates to video viewership. Our results suggest that our catalog captures many formal features that are predictive of video viewership.

METHOD

Video Sample

We selected a sample of 200 YouTube screen-capture tutorials that met several criteria. We began by compiling a list of the top 10 best-selling applications from each category in the Apple App Store, excluding the Games category, giving us a total of 190 applications. Then, a YouTube search of "[application] tutorial" was conducted for each application, with results limited to videos equal to or less than four minutes long. Based on these search results, we chose a subset of 34 applications for which the results suggested it would be relatively easy to find relevant videos (i.e., the first two search results that we screened appeared to be relevant screen-capture tutorials).

For each of these 34 applications, we randomly[1] viewed videos on the first page of search results to locate up to seven relevant screen-capture tutorials. We moved to the next application either when we found a seventh relevant video or when five attempts failed to produce a relevant video.[2] This methodology produced an initial list of 126 screen-capture tutorials.

Fourteen of the 34 applications required, at most, eight random viewings to find seven relevant screen-capture tutorials. For these 14 applications, we repeated our process to find up to nine additional screen-capture tutorials. This resulted in 109 additional screen-capture tutorials.

Thus, a total 235 relevant YouTube screen-capture tutorials relating to 34 applications were found. Our goal was to code 200 screen-captured tutorials; we oversampled and chose 235 in anticipation of having to eliminate some during the coding process. Thirty videos were eliminated: iPad and mobile device screen-capture tutorials were eliminated due to the absence of a cursor, and videos that served as global introductions to a series of specific tutorials were eliminated due to their non-instructive function. This left us with 205 screen-capture tutorials, of which we randomly cut 5 to reach our target of 200.

Our final sample of 200 screen-capture tutorials included tutorials for software in the following content areas: graphics & design (e.g., Affinity Designer), medical (e.g., Human Anatomy Atlas), music (e.g., GarageBand), photography (e.g., Photoshop), productivity (e.g., 1Password), social networking and communication (e.g., iMessage), utilities (e.g., Disk Doctor), and video (e.g., Final Cut Pro). The majority of videos were posted by individual users of the software, though some were posted by the companies producing the software. The average "age" (time since posting) of the tutorials in our sample was 6.7 months. The mean number of views for the videos in the sample was 9,359, but that was skewed by one video that had been viewed over 1,000,000 times and another that had been viewed over 300,000. The median number of views for the videos in the sample was 457.

Video Coding

Each of the 200 screen-capture tutorials in our sample was viewed and coded, independently, by two raters. First, each video was coded by one of three omnibus raters. Omnibus raters viewed the videos on YouTube using their personal laptop computers, recorded video statistics (e.g., duration on YouTube, number of views), and coded for all of the formal features included in our catalog (described below).[3] Subsequently, a blind rater independently viewed the videos on a laboratory computer, where they were embedded in a custom program that hid video statistics (e.g., number of views, subscribers, etc.). The blind rater rated each video only on three dimensions of quality: content quality, production quality, and effective guidance of attention.

The omnibus raters' primary task was to code each video for a variety of features within the four categories of our catalog (attention cues, segmentation cues, content features, and vocal performance). These features are described on the next page.

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1 Specifically, we used a random number generator to generate numbers between 1 and 20, and viewed the video in the position corresponding to the randomly-generated number.

2 We considered a video relevant if it was a screen-capture tutorial containing instruction about how to perform at least one task in, or use at least one feature of, the application.

3 Two omnibus raters coded 70 screen-capture tutorials and the third coded 60 screen-capture tutorials.

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Attention cues. Omnibus raters coded the frequency of seven attention cues:

i. *Cursor Location Highlighting*: use of highlighting or other graphical cues (e.g., a circle around the cursor) to call attention to the cursor as it moves around the screen. Rating guideline: 0 = never, 1 = once, 2 = 2–3 times, 3 = frequent.

ii. *Cursor Click Highlighting*: use of highlighting or other graphical cues (e.g., a circle around the cursor) to call attention to the cursor o*nly when the cursor is clicked*. Rating guideline: 0 = never, 1 = once, 2 = 2–3 times, 3 = frequent.

iii. *Screen Zooms*: transitioning from a full-screen view to a "close-up" of a region of interest. Rating guideline: 0 = never, 1 = once, 2 = 2–3 times, 3 = frequent.

iv. *Goal Region Highlighting*: highlighting a particular region of the screen relevant to the narrator's task. Rating guideline: 0 = never, 1 = once, 2 = 2–3 times, 3 = frequent.

v. *Spatial Text*: text appears on-screen in a spatial location relevant to its meaning (e.g., labeling a region of interest). Rating guideline: 0 = never, 1 = once, 2 = 2–3 times, 3 = 4–10 times, 4 = frequent.

vi. *Deictic Mouse Gestures*: intentional cursor movements that refer to or highlight part of the screen. Rating guideline: 0 = never, 1 = once, 2 = 2–3 times, 3 = 4–10 times, 4 = frequent.

vii. *Deictic Hand Gestures*: movements of the narrator's hand, visible in the video, that refer to or highlight part of the screen. Rating guideline: 0 = never, 1 = once, 2 = 2–3 times, 3 = 4–10 times, 4 = frequent.

We calculated a composite attention cue score for each video by taking the mean of the video's standardized[4] ratings for each of the seven attention cues. Raters also responded to a catch-all "other attention cues" category, which was coded dichotomously: Videos were scored '1' if the rater identified the use of at least one type of attention cue not included in the catalog, and '0' if the rater did not.

Segmentation cues. Omnibus raters coded the frequency of five segmentation cues:

i. *Speed Changes*: the speed at which the video plays is sped up or slowed down for specific parts of the video (e.g., the video "fast forwards" through a part that demonstrates a redundant step). Rating guideline: 0 = never, 1 = once, 2 = 2–3 times, 3 = frequent.

ii. *Between-Scene Cuts*: visible cuts (breaks in recording) between scenes or events. Rating guideline: 0 = never, 1 = once, 2 = 2–3 times, 3 = frequent.

iii. *Ellipses*: omitting intervals of video within an event (e.g., the video completely skips a part that would demonstrate a redundant step). Rating guideline: 0 = never, 1 = once, 2 = 2–3 times, 3 = frequent.

iv. *Non-Cut Cues*: manipulations of the screen other than cuts to signify that one event is ending and another is beginning (e.g., fade or dissolve effects). Rating guideline: 0 = none, 1 = some.

v. *Nonspatial Text to Segment*: text appears on-screen to signify the beginning or end of an event (e.g., the words "Step Two" appearing on-screen as the narrator begins a new step).

We calculated a composite segmentation cue score for each video by taking the mean of the video's standardized ratings for each of the five segmentation cues. Raters also responded to a catch-all "other segmentation cues" category, which was coded dichotomously: Videos were scored '1' if the rater identified the use of at least one type of segmentation cue not included in our catalog, and '0' if the rater did not.

Content features. Raters coded the content of the videos on nine dimensions.

i. *Face Shown*: the narrator's face appears on-screen at some point during the video. Rating guideline: 0 = absent, 1 = present.

ii. *Vocal Narration*: the video (or at least some part of it) is accompanied by vocal narration. Rating guideline: 0 = absent, 1 = present.

iii. *Instructor Introduction*: the instructor introduces himself or herself to the viewer either vocally (e.g., "Hello, my name is Bill") or through on-screen

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4   A standardized rating represents the number of standard deviations above or below the mean that a particular rating falls. To standardize any particular rating X for formal feature Y, we subtracted the mean of all ratings of formal feature Y, then divided the difference by the standard deviation of all ratings of formal feature Y. For example, assume that omnibus rater A rated Video 1 a "4" for deictic mouse gestures. Further assume that the mean of all ratings for deictic mouse gestures across all videos was 2, with a standard deviation of 1.5. We would standardize omnibus rater A's rating of Video 1 as follows: (4 - 2) / 1.5 = 1.33.

text or graphics (e.g., Bill's name appears on screen). Rating guideline: 0 = absent, 1 = present.

iv. *Graphical introduction*: an on-screen graphic related to the instructor or video content appears early in the video (e.g., a logo for the company creating the video; a title screen reflecting the video topic). Rating guideline: 0 = absent, 1 = present.

v. *Content Introduction*: the instructor describes, either vocally or through on-screen text or graphics, what the video will cover before beginning the substantive instruction. Rating guideline: 0 = absent, 1 = present.

vi. *Background Music*: the video (or at least some part of it) is accompanied by music that was not part of the tutorial itself. Rating guideline: 0 = absent, 1 = present.

vii. *Mouse Click Errors*: the narrator clicks in the wrong place on the screen (e.g., the narrator attempts to click an "OK" button and misses; the narrator clicks on the wrong menu before correcting himself or herself and selecting the correct menu). Rating guideline: Raters recorded a count of the total number of mouse click errors.

viii. *Non-Deictic Mouse Movements*: mouse movements that are expressive but lack spatial reference (e.g., moving the mouse rapidly around the screen to signify frustration). Rating guideline: 0 = never, 1 = once, 2 = 2–3 times, 3 = 4–10 times, 4 = frequent.

ix. *Nonspatial Text*: on-screen text that does not label a particular area or serve a segmentation function (e.g., a 'This Will Not Work in Windows' disclaimer on the bottom of the screen).

We calculated a composite content features score for each video by taking the mean of the video's standardized ratings for each of the nine dimensions of content features (with the Mouse Click Errors dimension reversed).

Vocal performance. 139 of the 200 surveyed videos included narration. For these videos, the omnibus raters coded two aspects of narrative quality: vocal expressiveness and the prevalence of disfluencies in the narrator's speech. By disfluencies, we mean interruptions in the flow of a narrator's speech, such as long pauses, repetitions of words or syllables, or distracting use of vocal fillers such as "um" and "like." For vocal expressiveness, raters used a seven-point

scale with anchor points of 1 = inexpressive and 7 = highly expressive. For disfluencies, raters used the following seven-point scale: 1 = none; 2 = very few, not disruptive; 3 = very few, slightly disruptive; 4 = few, somewhat disruptive; 5 = few, disruptive; 6 = many, very disruptive; 7 = many, extremely disruptive. We calculated a composite vocal performance score for each video by taking the mean of its standardized rating for expressiveness with its reverse-scored and standardized rating for disfluencies.

Ratings Evaluating Quality

In addition to being coded for the cataloged features, each video tutorial was also rated on three dimensions of quality: content quality, production quality, and effective guidance of attention. These quality ratings were provided both by the video's original omnibus rater and, more importantly, by the blind rater. We had the blind rater evaluate quality because of the potential that the omnibus raters' quality ratings were biased: Omnibus raters had access to possible heuristics for estimating video quality (e.g., the omnibus raters could have used views as a basis for quality ratings), and also could have been biased by the way they viewed the videos (e.g., omnibus raters on the lookout for deictic mouse gestures and segmentation cues may view videos in fundamentally different ways than the typical YouTube viewer, who watches the video more holistically). To address these concerns, the blind rater viewed videos on a desktop computer in our lab, using a program that ensured that the blind rater was blind to video statistics (views, subscriptions, etc.) and to all of the omnibus raters' coding. Thus, these factors could not influence the blind rater's quality ratings. The blind rater provided evaluations of content quality, production quality, and effective guidance of attention for 195 of the 200 videos (five of the videos were no longer available when the blind rater began coding).

All raters were given anchor points to guide their quality ratings. For content quality, raters were told that "1 = poor – worst – very unclear, not useful, inaccurate," that "4 = average," and that "7 = excellent – best – very clear, very useful, highly accurate." For production quality, raters were told that "1 = poor – worst – amateurish looking and sounding," that "4 = average," and that "7 = excellent – best – professional looking and sounding." For effective guidance of

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attention, raters were told that "1 = poor – worst – less than necessary/ineffective guidance," that "4 = average – amount of guidance reasonable/somewhat effective guidance," and that "7 = excellent – best – appropriate amount of guidance/very effective guidance."

We calculated two composite quality ratings for each video, one based on scores awarded by the omnibus rater and one based on the scores awarded by the blind rater. We computed these scores by averaging the relevant rater's standardized ratings of content quality, production quality, and effective guidance of attention. We use the blind rater's composite quality ratings in all viewership analyses reported below to avoid the possibility, mentioned above, that the omnibus raters' quality ratings may have been influenced by their coding of other video features.[5]

Inter-rater Reliability

For the purpose of calculating inter-rater reliability, we asked each one of the three omnibus raters to provide a "second opinion" (a second complete set of ratings) for 20 of the videos in our sample. We used these "second opinion" ratings only for the purpose of calculating inter-rater reliability. We assessed reliability with a one-way random-effects, consistency, single-measure intraclass correlation coefficient (ICC; see Hallgren, 2012), generated using IBM's SPSS software platform. Table 1 summarizes the ICC's for the coders' ratings of attention cues, segmentation cues, content features,[6] vocal expressiveness, vocal disfluency, and quality. All were highly significant and indicated at least 'fair' agreement (Ciccheti, 1994).[7]

Table 1. Inter-rater reliability (ICC) for feature scores

Dimension	ICC
Attention Cues	.73
Segmentation Cues	.81
Content Features	.66
Vocal Expressiveness (for Narrated)	.52
Disfluencies (for Narrated)	.51
Overall Quality	.70
Content Quality	.56
Production Quality	.66
Effective Guidance of Attention	.57

In addition, with respect to the ratings of video quality, we evaluated inter-rater reliability between the omnibus rater and the blind rater for the 195 videos the blind rater coded. Our results are summarized in Table 2. The ICC for overall quality ratings was "good," and ICC's among the three component quality ratings were all highly significant and indicated at least 'fair' agreement (Ciccheti, 1994). We note these results because of their interesting implication: While there was potential for bias in omnibus raters' quality ratings (given their access to views, likes, etc.), their ratings were actually fairly similar to those of the blind rater.

Table 2. Inter-rater reliability (ICC) between omnibus rater and blind rater for video quality ratings

Dimension	ICC
Overall Quality	.63
Content Quality	.51
Production Quality	.52
Effective Guidance of Attention	.47

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5   We note, however, that the pattern of results in our viewership analyses is substantially similar if the omnibus raters' quality ratings are used instead of the blind rater's quality ratings.

6   Because many of the individual features that we coded in the videos were rare, we used overall category-level scores for the first three categories of features in our assessment (attention cues, segmentation cues, and content features).

7   "The guidelines state that, when the reliability coefficient is below 0.40, the level of clinical significance is poor; when it is between .40 and .59, the level of clinical significance is fair; when it is between .60 and .74, the level of clinical significance is good; and when it is between .75 and 1.00, the level of clinical significance is excellent." (Ciccheti, 1994, at 286.)

RESULTS

Frequency of Video Features

First, we report the prevalence of the formal features coded in our survey. Table 3 shows the percentage of screen-capture tutorials in our sample that used (at least once) the attention cues in our catalog. A substantial majority (88.5%) of videos used one or more attention cue. The most common attention cue was deictic gestures with the mouse cursor, which were used in 56.5% of videos surveyed. However, software highlighting features such as cursor click highlighting and screen zooming were used in approximately a quarter of videos each.

Table 4 shows the percentage of screen-capture tutorials in our sample that used (at least once) the segmentation cues in our catalog. Segmentation cues were used less frequently than attention cues: Only 31.5% of the videos in our survey used at least one segmentation cue. Non-cut cues—for example,

Table 3. Percentage of videos with at least one instance of each attention cue

Attention Cue	Prevalence (%)
Deictic Mouse Gestures	56.5
Cursor Click Highlighting	23.5
Screen Zoom	23.0
Cursor Location Highlighting	11.5
Goal Region Highlighting	11.5
Spatial Text	07.5
Deictic Hand Gestures	00.5
Other Attention Cues	08.0

Table 4. Percentage of videos with at least one instance of each segmentation cue

Segmentation Cue	Prevalence (%)
Non-Cut Cues	18.0
Between-Scene Cuts	11.0
Nonspatial Text to Segment	08.5
Speed Changes	04.0
Ellipses	03.5
Other Segmentation Cues	05.5

fadeouts between topics—were the most common type of segmentation cue.

We observed a few cues that were not included in our catalog. In three cases, animations were added to videos to direct spatial attention. Two of these were cartoon characters, and one was an animated arrow. Another video incorporated an unusual 3-D zooming effect. Unusual segmentation cues included a whooshing sound effect and a change in music to signal a new concept. In one video, a new section was introduced by blurring the screen in addition to using text to introduce a new concept.

Table 5 shows the percentage of screen-capture tutorials in our sample that contained the content features in our catalog. As expected, the narrator's face was rarely shown in screen-capture videos. Most videos (69.5%) included vocal narration. Among the videos that did not include vocal narration, some communicated instructions via on-screen text, but most simply demonstrated program features and left it to viewers to infer steps from viewing the action. A majority of videos included some sort of introduction of the video's content or its creator. Slightly over one-third of the screencasts sampled were set to music.

Formal Features as Predictors of Video Viewership

In addition to surveying formal features, we investigated the relation between the instructor's use of various types of formal features and video viewership. Views have long been of critical importance for content

Table 5. Percentage of videos with at least one instance of each content feature

Content Feature	Prevalence (%)
Instructor Introduction	86.0
Content Introduction	79.0
Vocal Narration	69.5
Graphical Introduction	55.0
Non-Deictic Mouse Movements	38.5
Music	35.0
Mouse Click Errors	25.0
Nonspatial Text	24.5
Face Shown	05.5

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creators, as views are needed to generate revenue from advertisements.[8] Viewership on YouTube is influenced by an array of factors outside the scope of our catalog of formal features, including things like video tags, search algorithms, and channel inclusion. Nevertheless, we expected that use of the formal features that we cataloged would predict[9] some portion of the variability in video viewership. We reasoned that this might occur either because formal features tend to make videos more effective, or because the content creators who leverage formal features in their videos tend to be more thoughtful in designing and structuring their videos in general.

To quantify video viewership, we calculated each video's views per month available. (We did this to account for differences in total number of views related to video age.) The mean number of views per month was 960 (range 1.25 to 85,194), but the distribution was strongly right-skewed, with a median of 80 views per month. We normalized the distribution by log-transforming the monthly views data. All viewership analyses were performed on the log-transformed data.

We hypothesized that viewership would be predicted by videos' use of the features we cataloged: attention cues, segmentation cues, content features, and vocal performance. We recognized, however, that the hypothesized relations might be indirect, explained—at least in part—by relations between formal features and viewers' perceptions of video quality. That is, it could be the case that the effective use of formal features tends to leave viewers with the impression that a video is of high quality, and that perceptions of high quality, in turn, predict viewership. Nevertheless, we posited that formal features might also predict viewership directly, separate and apart from their relation with perceived quality (for a discussion of indirect versus direct effects, see Loehlin, 2011; MacKinnon et al., 2007).

To test our hypotheses, we performed three sets of analyses. We performed three sets because, while 69.5% of videos in our sample featured vocal narration (and were therefore coded for vocal expressiveness and disfluencies), 30.5% did not (and were not). Thus, our first set of analyses includes the full sample of screen-capture tutorials, our second set examines the 139 screen-capture tutorials featuring vocal narration, and our third set examines the 61 videos without vocal narration.[10]

Our first two sets of analyses begin with path analyses. Path analyses are not frequently used in the technical communication literature, but they are useful tools for analyzing complex relations among variables. Specifically, path analysis builds upon multiple regression to allow researchers to probe whether relations between variables—for example, the relation between childhood abuse and aggression as an adult—are direct (e.g., increased experience with childhood abuse predicts increased aggression as an adult) or indirect (e.g., increased experience with childhood abuse predicts altered processing of social behaviors, which in turn predicts increased aggression as an adult; see MacKinnon et al., 2007). Here, we opted to perform path analyses because they allow us to evaluate direct relations between formal features and video viewership, while also evaluating potential indirect relations in which formal features predict perceived quality, which in turn predict viewership. Our path analyses were conducted with IBM SPSS Amos.

We summarize the results of our path analyses by presenting path models. Path models graphically illustrate the direct and indirect relations among the relevant exogenous variables (i.e., predictor variables, which are not explained by other variables in the model) and endogenous variables (i.e., outcome, or predicted, variables, which are explained by other variables in the model). Path models capture these

8 The number of times a video is viewed may be a useful proxy for perceived effectiveness, as viewers tend to recommend and share links to videos that they find useful.

9 When we discuss formal features "predicting" views in the context of our statistical analyses, we are not suggesting that use of formal features *causes* increased viewership. Indeed, our analyses are built on correlations and do not allow us to make any definitive claims about the direction of causal relations among variables. When we say that one variable "predicts" another, we mean changes in one variable—referred to as a "predictor" variable in regression and path analysis—is associated with a change in another variable—referred to as an "outcome" variable.

10 On a descriptive note, the 139 videos with vocal narration were viewed an average of 1,214 times per month (with a standard deviation of 7,651 views per month). Videos without vocal narration were viewed an average of 384 times per month (with a standard deviation of 909 views per month). This difference in views between videos with vocal narration and videos without vocal narration was not statistically significant, t(198) = 0.843, p = .40.

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relations by using *path coefficients*—standardized values akin to beta weights in regressions[11]—to communicate the relative strength of relations and arrows to display the hypothesized direction.[12] In Figures 1 and 2, these numerical coefficients are printed adjacent to arrows illustrating relations between variables. The coefficients reflect the amount of variance that the variable at the arrow's source explains for the variable at the arrow's head. Because the coefficients are standardized, they vary between +1 and -1. The farther the coefficient is from 0 the stronger the relation, and statistically significant coefficients are printed in black text in the figures. The sign on the coefficient represents the direction of the relations. Positive coefficients indicate that increases in one variable are associated with increases in the other, while negative coefficients indicate that increases in one variable are associated with decreases in the other. A useful introduction to path analysis is provided by Loehlin (2011).

The variables in our path analyses represent the composite variables for each feature category (as many of the individual features that we coded were too rare to be meaningfully incorporated into the analyses on their own). Because segmentation cues, as a category, were rare, they were combined with attention cues for the

purposes of our path analyses. For any given video, the combined variable "Attention and Segmentation Cues" variable represents the average of the video's composite attention cue score and its composite segmentation cue score, the "Content Features" variable represents the composite content features score, and (in our analyses of the subset of videos featuring vocal narration) the "Vocal Performance" variable represents the composite vocal performance score. As described above, Attention and Segmentation Cues, Content Features, and Vocal Performance were coded by omnibus raters. The "Quality" variable represents the composite quality rating from our blind rater, as the blind rater's ratings were not susceptible to influence from video statistics such as views. Quality was positioned as a potentially mediating variable in all of our path models.

Analysis of the full sample

Our first path analysis examined the relations between formal features (Attention and Segmentation Cues; Content Features) and viewership, including direct relations and also indirect relations mediated by Quality. This analysis included the 195 videos for which we had Quality data (all but the five videos that our blind rater was unable to rate). The resulting,
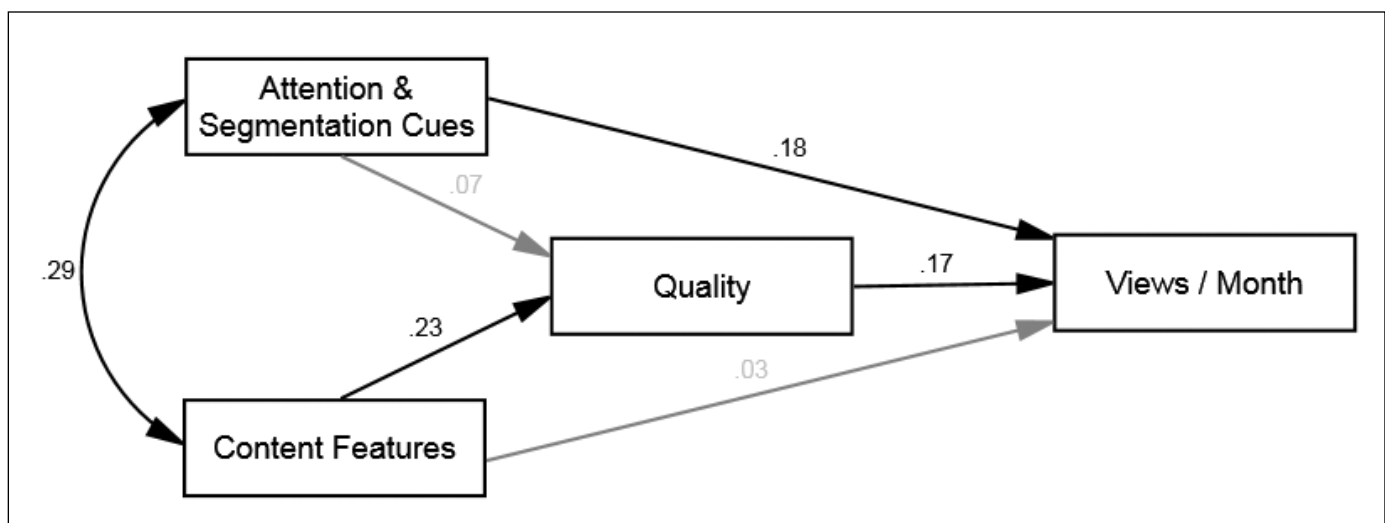
Figure 1. Path model predicting video viewership in the entire sample of surveyed videos. The path analysis included residuals for all endogenous variables (Quality and Views / Month), but these are not shown in the path model for ease of readability. Arrows and coefficients in black reflect statistically significant relations.

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11 Some path models use unstandardized path coefficients, though these are less common than path models using standardized path coefficients (see Loehlin, 2011). All of the path models in this article show standardized path coefficients.

12 Double-headed arrows reflect correlations with no direction hypothesized.

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just-identified path model can be seen in Figure 1. The variables in our model explain 7.7% of the observed variability in video viewership (R^2Views/Month = .077). In the model, significant relations between variables are represented by black lines, while non-significant relations are represented by gray lines.

As shown in Figure 1, Attention and Segmentation Cues and Quality were both directly and positively related to viewership (Attention and Segmentation Cues: (β = 0.179, p = .012; Quality: β = 0.171, p = .017). Attention and Segmentation Cues only predicted viewership directly; they were not related to Quality (β = 0.071, p = .326). Content Features also predicted video viewership, but only indirectly via Quality.[13]

Having observed a direct link between Attention and Segmentation Cues and video viewership, we were interested in whether that direct link was more attributable to attention cues or to segmentation cues. To investigate, we conducted a multiple regression with viewership as our outcome variable. The predictor variables of interest were Attention Cues (the composite attention cues score) and Segmentation Cues (the composite segmentation cues score); we also controlled for Content Features and Quality. Our results, reported in Table 6, indicate that Segmentation Cues significantly predicted video viewership while Attention Cues did not.

Table 6. Regression predicting number of views/month
Predictors: Quality, Attention Cues, Segmentation Cues, Content Features
R^2 = .086, F(4,190) = 4.454, p = .002

Predictor	Beta	t	p value
Segmentation Cues	.185	2.508	.013
Quality	.182	2.514	.013
Content Features	.055	0.744	.458
Attention Cues	.007	0.096	.924

Finally, we wanted to confirm that the patterns of relations among the variables in Figure 1 were not driven by the presentation styles or popularity of particular

screencast authors. Although the majority of the screen-capture tutorials in our sample were created by different screencast authors, there were 26 authors who created more than one tutorial in the data set. To account for this, we trimmed our data set to allow for only one entry per author. For those who authored multiple tutorials in the sample, we created a single entry by averaging the coded variables across all of the authors' tutorials. We then re-ran the path analysis reflected in Figure 1 using this trimmed data set. The pattern of significant and insignificant paths was the same as in Figure 1, with one exception: the direct link between Attention and Segmentation Cues and viewership, which was statistically significant in Figure 1, fell just short of significance with less power in the model based on the trimmed data set (β = .154, p = .069).

Analysis of videos with vocal narration
We conducted a second path analysis on the 139 screen-capture tutorials in our sample that featured vocal narration. This path analysis included Vocal Performance as an additional predictor.

The variables in this path model explain 14.2% of the observed variability in video viewership (R^2Views/Month = .142). The pattern of statistically significant and insignificant paths illustrates that Vocal Performance is quite predictive of viewership of screen-capture tutorial videos. As shown in Figure 2, Vocal Performance is the only significant predictor of Quality (β = .390, p < .001) and of video viewership (β = .356, p < .001) in the model. Thus, it seems that among the videos with vocal narration, Vocal Performance is such a powerful predictor of perceived Quality and viewership that including it in the model eliminates the predictive value of Attention and Segmentation Cues and Content Features.

Once again, we re-ran this path analysis using the trimmed data set that included a maximum of one entry per author. The pattern of significant and insignificant paths was identical to the pattern reported in Figure 2.

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13 To test for a significant indirect relation between Content Features and viewership (via Quality), we ran a mediation analysis using Hayes' PROCESS macro for IBM SPSS. Our analysis indicated a significant indirect relation (completely standardized indirect effect: β = .0378, SE = .0201, BCa CI [.0084, .0925], p < .05). For discussion of completely standardized indirect effects and their interpretation, see Preacher & Kelley, 2011. The relation between Content Features and viewership in our data was only indirect. As shown in Figure 1, when Quality is included in the model as a mediator, there is no direct relation between Content Features and viewership (β = .033, p = .653).

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Analyses of videos with no vocal narration

We expected that in videos with no narration, Attention and Segmentation Cues would be especially relevant to audience response. To test this hypothesis, we conducted a multiple regression predicting viewership for the videos without narration in our sample. (We conducted a multiple regression because the smaller subsample of videos without narration did not provide enough power for a meaningful path analysis.) Of the videos without narration, 59 were among those coded for quality by our blind rater.

Our multiple regression included Attention and Segmentation Cues, Content Features, and Quality as predictors of viewership. Overall, despite limited power, our model was nearly statistically significant, $F(3, 55) = 2.593$, $p = .062$. As reported in Table 7, Attention and Segmentation Cues was the only significant predictor in the model ($\beta = .277$, $p = .046$), with more use of attention and segmentation cues predicting more views.

DISCUSSION

In this article, we have presented a catalog of formal features that creators of screen-capture tutorial videos can use to facilitate communication to viewers. A survey of 200 screen-capture tutorial videos from YouTube revealed that screencast authors are using many of the formal features in our catalog, to varying degrees. The catalog we have developed can no doubt be revised and expanded in future work. There are other characteristics of screen-capture tutorials that can contribute to variability in viewership, including the topic itself, the creator or channel, physical characteristics (e.g., screen resolution), accessibility characteristics (e.g., captions or subtitles), and characteristics relating to the broader YouTube ecology (e.g., video tags). Further, the catalog will need to change as screen-capture software develops and provides authors with additional flexibility. However, we suggest that the categories of formal features in our catalog are likely to be stable and useful as screen-capture technology changes, in part because of their close relations to basic cognitive skills used when viewing screencasts.

Table 7. Regression predicting number of views/month in videos without narration
Predictors: Quality, Attention and Segmentation Cues, Content Features
$R^2 = .124$, $F(3,55) = 2.593$, $p = .062$

Predictor	Beta	t	p value
Att. & Segment. Cues	.277	2.039	.046
Quality	.163	1.248	.217
Content Features	.028	0.199	.843
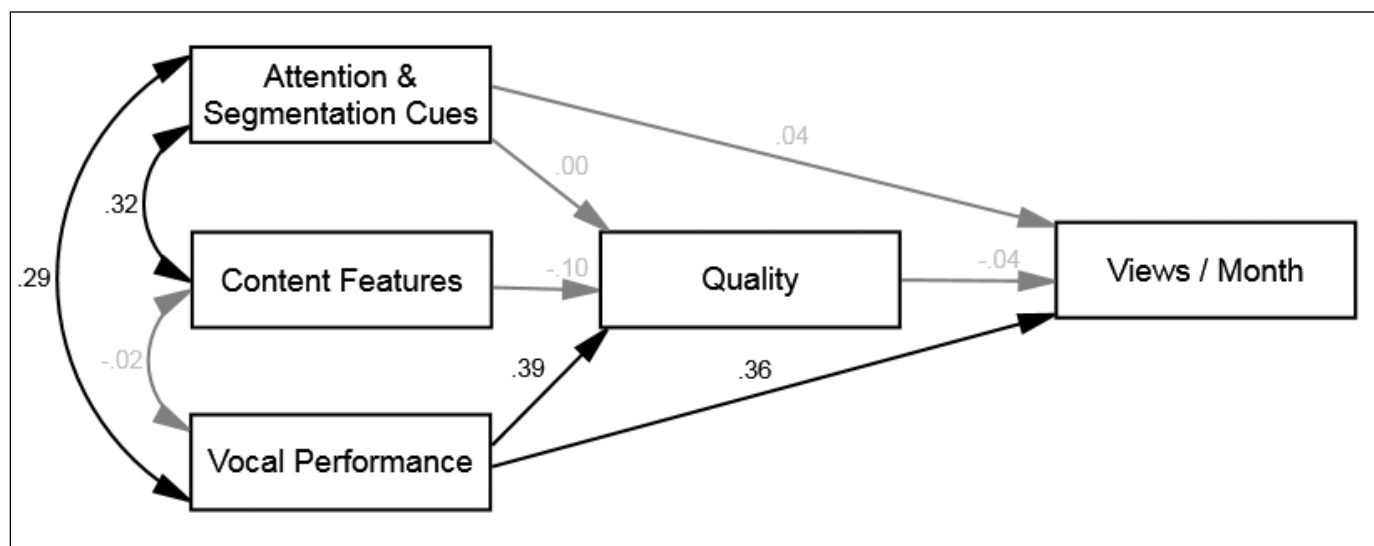
Figure 2. Path model predicting video viewership for videos with vocal narration. The path analysis included residuals for all endogenous variables (Quality and Views / Month), but these are not shown in the path model for ease of readability. Arrows and coefficients in black reflect statistically significant relations.

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Path analyses and regression analyses indicated that creators' use of formal features in our catalog predicted video viewership. Certain types of features—vocal performance and segmentation cues—were especially predictive. When considering the relations between formal features and viewership, one interesting possibility is that some of the features available to screencast authors may be systematically underused. Segmentation cues may be an example. In the multiple regression reported in Table 6, segmentation cues had a bigger positive relation with viewership (β = .390, p = .013) than other categories of formal features. Yet, segmentation cues were used with the least frequency, appearing in only 31.5% of the videos rated. It is important to keep in mind that our analyses do not allow us to draw inferences about the direction of this relation between segmentation cues and views. It could be that segmentation cues themselves help videos draw an audience. Perhaps by reducing the viewers' burden to mentally organize the events in the tutorial, segmentation cues allow viewers to more readily extract the critical information (*see* Zacks et al., 2010). Alternatively, perhaps creators who go through the effort to add segmentation cues to their videos simply tend to produce more thoughtful videos with better content. In any case, our findings tentatively suggest that screen-capture authors might benefit from using segmentation cues more frequently.

One caveat to our observation about segmentation cues is that our survey sample was deliberately restricted to brief (under 4–minute) videos. It is possible that longer videos make more use of segmentation cues, if only because they contain more content to segment. Nevertheless, even among the brief videos we surveyed, there were many lessons that were complex enough for segmentation to have been useful. It may be that, regardless of video length, authors who are familiar with the content they are teaching tend to underestimate the usefulness of segmentation cues to their audience of novices.

Our path analyses also suggest the importance of vocal performance in screencasts. Among screencasts with narration, vocal expressiveness and disfluency were such strong predictors of video viewership that they effectively washed out the predictive value of every other category of formal feature (see Figure 2). This was surprising. Vision is widely considered to be the most important sense humans use to obtain information (e.g., Hershberger, 1992; Moore, 1996). Yet, our results suggest that the auditory component of the screencast may be more important than the visual. One potential explanation relates to the fact that screencast videos typically involve step-by-step demonstrations of the performance of an operation. The sequence of the steps is important. Thus, the relationship between viewership and narrative expressiveness/fluency may reflect the role of linguistic working memory in sequence comprehension (see Magliano et al., 2016). Furthermore, content creators who are knowledgeable and enthusiastic about a topic may tend to produce both better vocal performances and better overall information, which is ultimately reflected in viewership.

While vocal performance appears to be a significant contributor to the popularity of screen-capture tutorials, there is hope for screencast authors who are less able (or less confident in their ability) to deliver fluent, expressive narration. Over 30% of the screencasts we surveyed had no narration, and many had received a lot of views. Indeed, in our sample, video viewership did not significantly differ between videos with vocal narration and videos without vocal narration. The videos without narration were viewed an average of 384 times per month, and four were viewed more than 1,000 times per month. The regression analyses we performed on the videos without vocal narration indicated that, in the absence of vocal narration, attention cues and segmentation cues may take on added importance. Thus, if a screencast author does not wish to provide voice-over, the author may want to pay careful attention to his or her use of visual cues to guide viewers' attention and help them parse events.

Finally, it is noteworthy that, in our data set, the relation between content features and viewership was different from the relation between attention/segmentation cues and viewership. There was no direct relation between content features and viewership—only an indirect relation mediated by perceived quality. In contrast, attention/segmentation cues had a more direct relation with viewership, independent of their relation with perceived quality. This distinction should be interpreted with some caution, given that the mediating perceived quality variable is based on the ratings of a single blind rater. More generally, our single study cannot definitively specify all of the links in the path models we propose. Nevertheless, screencast creators should be aware of the possibility that using some formal features may directly relate to viewership, while other formal

features may relate to viewership if they are executed effectively enough to contribute to perceived quality.

CONCLUSION

Our goal in this paper was to begin describing the formal features of screen-capture instructional videos. We have cataloged many of the formal features that screencast authors use to communicate with their viewers, and we offer an empirically grounded framework for thinking about these features according to function and modality. In addition, we identified relations between authors' use of these features and video viewership. Our results suggest that certain features, like segmentation cues and vocal performance, are particularly closely related to viewership. It is our hope that our findings provide additional scaffolding for future research on screencasts—research that might help content creators leverage formal features to communicate more effectively with viewers.

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Using Schema for Analyzing Audiences: Complexity and Simplicity Balance

By Eric Sentell

ABSTRACT

Purpose: This paper builds on a primary study (Sentell, 2016) that demonstrated how information can be presented more memorably through engaging an audience's collective (self)schema. It analyzes real-world examples of these strategies and theorizes implications for audience analysis.

Method: An Uncle Sam poster promoting handwashing in a VA hospital and JFK's "man on the moon" speech are analyzed as notable examples of memorable communication. Each example illustrates (self)schema's influence on attention and recall as well as the strategies of engaging (self)schema: tapping the familiar, bridging to the unfamiliar, conveying practical value, and arousing emotions. I discuss how (self) schema can be used as a framework for analyzing audiences and developing personas.

Results: Using (self)schema as a framework for audience analysis is an intuitive, holistic alternative to more time- and resource-intensive methods. It can balance the competing needs for complex, multidimensional representations of audience and limited, simple distillations of those representations that can be useful during composing. Analyzing an audience's (self)schema can clearly organize a variety of dimensions and generate insights into likely emotional predispositions. Understanding the audience's (self) schema facilitates using familiarity, unfamiliarity, practical value, and emotions to enhance information's memorableness.

Conclusion: Technical communicators can use the concept of (self)schema to analyze audiences, craft personas, and engage the audience's (self)schema to make information more memorable, persuasive, and effective.

KEYWORDS: audience, audience analysis, schema, self-schema, memory

Practitioner's Takeaway:

- The concept of (self)schema can help technical communicators balance the needs for complex, multidimensional representations of audiences and simple representations that are more useful while composing.
- Using (self)schema as a framework for audience analysis can be an effective alternative when budgetary, time, or training constraints make more detailed methods impractical.
- The (self)schema framework can be applied systematically by means of a few generative questions and one's direct experience with an audience, which may take the form of reading or listening to its discourse or reflecting on its common experience.

USING SCHEMA

In technical communication scholarship, discussions of memory usually explore managing one's composing, research, or reading processes (van Ittersum, 2007, 2009; Whittemore, 2008, 2015). However, memorability can also be viewed as a trait of documents. Numerous eye-tracking studies have observed a relationship between attention's length and recall's accuracy (Lee & Ahn, 2012) because a person must pay attention to information to "encode" it into long-term memory for later retrieval (Nairne, 2011). It follows that we can impact a reader's memory by presenting information in ways that facilitate effective encoding (or not). In a previous study (Sentell, 2016), I demonstrated that contrast, color, and imagery influence an audience's attention and memory; these design elements attract and allocate attention, thus increasing the likelihood of encoding information into long-term memory. Unexpectedly, my study also revealed the mnemonic effects of engaging an audience's collective schema and self-schema; subjects were more likely to recall documents that engaged their (self) schema, and their self-reported reasons for recalling information often involved their (self)schema.

Schemas are "cognitive frameworks that guide memory, aide in the interpretation of events, and influence how we later retrieve stored memories" (Flannery & Walles, 2003, p. 151). According to Green (2010), a schema is an implicit, nonconscious cognitive "organizational structure that helps us keep track of the information bombarding our limited attentional capabilities" at any given moment (pp. 136–137). Although schema are nonconscious, they can be overridden or manipulated with conscious effort (similar to how we can regulate our breathing once we attend to it). Green continues, "Though we might not be aware of it, a schema can help save our limited attention by directing our attention to where it is needed. . . . We pay attention to things our schema predicts. . . . [therefore] it is much easier to recall things that fit within your schema" (p. 137). For example, Green's schema for student behavior that indicates comprehension includes note-taking, eye contact, answering questions, participating, and positive body language. Nonconsciously, she will ignore other behaviors indicating understanding since she notices what her schema predicts. She will also miss behaviors that suggest confusion, unless she consciously focuses on schema for such behavior. Schema help us "predict what will come next, guide our attention, and even help us to interpret events" (p. 143).

Self-schema, or cognitive frameworks about oneself, affect one's judgment of salience (Markus, 1977). People are more likely to notice, attend to, and encode information that fits their cognitive frameworks about themselves, that their self-schema implicitly "predict" to be important, useful, or relevant. For example, I created flyers advertising a new class I am teaching, and suddenly I began noticing the department bulletin boards, the crowded and haphazard placement of flyers, and the effects on my flyer. Certain groups have similar self-schema as a result of belonging to the same discourse community (Porter, 1986) — that is, having similar cultural, social, linguistic, and cognitive experiences. Simply sharing schema can bond people together, as people with similar schema are attracted to each other (Green, 2010, p. 141). In summary, both schema and self-schema affect our predictions about incoming information and thus what we notice, how (well) we encode it, and how (well) we retrieve it.

After briefly reviewing research on memory and audience (see Sentell, 2016, for a more thorough review), I will then analyze examples of technical communication that make information more memorable by engaging the audience's collective (self) schema (cognitive frameworks about oneself or one's group). I will also explore the implications for audience analysis practices. I will argue that the framework of (self)schema can contribute to existing methods of audience analysis and creating user personas, offer a strong alternative to more time- and resource-intensive methods, generate complex yet usable representations of audience, and facilitate making information more memorable. I acknowledge that the (self)schema framework has a sweeping scope, which can be a weakness if it is applied without a clear sense of purpose. Yet, the framework's scope also makes it easy to apply and adapt to manifold rhetorical situations, compensating for its weaknesses.

Throughout this paper, I will use "schema" to refer to general conceptual frameworks, "self-schema" for conceptual frameworks about oneself, and the hybridized "(self)schema" for contexts in which either general schema or personal self-schema might be the object of a given rhetorical strategy.

MEMORY IN TECHNICAL COMMUNICATION

Technical communication scholarship on memory tends to focus on how writers manage their research and writing processes to "off-load" or "embody" both cognition and memory. Whittemore (2015) uses case studies of technical communicators to describe and advocate a process of cultivating social, embodied memory practices for managing information, which can free up cognitive resources. Whittemore (2008) also critiques the interfaces of content-management systems (CMSs) for overloading technical communicators' memories. Van Ittersum (2007, 2009) explains how graduate students use digital writing tools such as Endnote or OneNote to create organized, searchable "memory systems" that facilitate their note-taking, research, and writing. Both Whittemore and van Ittersum ground their research in classical *memoria*, the architectural mnemonic in which orators mentally visualized information as distinctive symbols in familiar settings (Carruthers, 2008; Yates, 1966).

My previous study, "Making memories: Writing and designing more memorable documents" (2016), investigated the characteristics that make documents memorable. My subjects reported that contrast, color, and imagery were the most attention-catching design elements in the documents they observed. Information conveyed through these strategies was more likely to be noticed, encoded, and remembered. My study also revealed the importance of engaging readers' collective self-schema so that they view information as personally relevant and therefore worth encoding into long-term memory for later use. Strategies for engaging collective self-schema include (but are not necessarily limited to) using contrast, tapping the familiar, using unexpected elements, conveying practical value, building social currency, and arousing emotion.

RECONSTRUCTIVE MEMORY, SCHEMA, AND SELF-SCHEMA

Most scientific fields view memory as reconstructive and mutable, in contrast to previous conceptions of memory as data storage (Braun-LaTour et al., 2004; Francoz, 1999). Rather than recording and storing data, memory is a dynamic, socially situated process of reconstructing previous events and stimuli. Our reconstructions can morph over time and can be influenced by new information without our conscious awareness. Therefore, memory is a rhetorical site in and through which people can be informed or persuaded.

Many seminal and contemporary studies have demonstrated memory's reconstructive nature. Subjects consistently reinterpreted stories, pictures, or other stimuli, embellishing, deleting, or even fabricating details while insisting they were perfectly recalling the stimulus (Bartlett, 1932). Decades of "misinformation studies" show that our recollections of events sometimes merge with information learned afterward, leading to a reconstructed memory so unified we cannot distinguish which information came from which source (Loftus, 1997, 2005; Loftus & Palmer, 1974). Studies have induced false memories such as meeting the Warner Bros. character Bugs Bunny at Disneyland, getting lost at the mall as a young child, or simply over-estimating the speed of cars in a traffic accident, to name only a few examples.

When we reconstruct memories, we usually recall the relevant schema, or organized conceptual frameworks, that help structure our perceptions and recollections. Schema function like adaptable heuristics for organizing new information in relation to prior knowledge. If we alter our schema to incorporate new information, we encode that information into long-term memory. For example, most Americans do not need to significantly alter existing schema for Disneyland to incorporate Bugs Bunny, but they might have more difficulty incorporating dissimilar or unfamiliar misinformation.

Psychologists widely recognize that a person's various identities (e.g., husband, father, teacher) combine to form a "social self-schemata," or a unique memory structure, that influences behavior and cognition (Forehand et al., 2002, p. 1086). In other words, self-schema are conceptual frameworks about oneself. In a seminal article, Markus (1977) found that self-schema "function as selective mechanisms which determine whether information is attended to, how it is structured, how much importance is attached to it, and what happens to it" (p. 64). While schema organize known and incoming information, self-schema act like filters for one's attention by screening irrelevant stimuli and highlighting relevant information (Green, 2010). This process is nonconscious; we may be aware that certain stimuli interest us more than others, but we

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do not consciously decide whether stimuli match our self-schema.

People form their self-schema in terms of their group's collective memories, commonplaces, and discourse (Porter, 1986, pp. 38–39). In *A Rhetoric of Motives*, Burke (1969) explains, "insofar as their interests are joined, A is *identified* with B. . . . In being identified with B, A is 'substantially one' with a person other than himself . . . at once a distinct substance [or individual] and consubstantial with another" (pp. 20–21, emphasis in original). This process of identification establishes a common interest among otherwise divided people, leading to a feeling of unity that Burke calls consubstantiality. A group's consubstantiality most often comes from a shared cultural or historical background, or what might be described as a discourse community or a "collective" memory (Burke, 1969, *Grammar*, p. 55). Communication such as advertising can also create consubstantiality, or a collective identity, especially centered around a brand. Iconic brands like Apple, Nike, and Harley-Davidson create powerful myths that draw upon socio-cultural meanings, enact common interests and values, and embody distinct personas for both themselves and their customers (Kilambi et al., 2013). For another example, Eves (2005) describes how three cookbooks published by the National Council of Negro Women in the 1990s created a collective memory and communal identity. Paraphrasing Maurice Halbwachs, Eves explains that "collective memory is constructed around narrative frameworks . . . [that] invest meaning into the collective memories that define the community" (p. 282). More basically, any example of jargon, slang, vernacular, or socio-cultural norms shows that communication depends on some shared knowledge or understanding between writer and audience (Scott, 1999, p. 247; Phillips, 2010, p. 217).

DISTINGUISHING (SELF)SCHEMA FROM COMMONPLACES AND FRAMING

Clearly, (self)schema simultaneously depend on and reinforce shared narratives, knowledge, or commonplaces. According to Ross (2008), commonplaces trigger narratives and associations, which then generate and shape communication (p. 96). He defines a commonplace as a method for "bring[ing] an audience to a shared understanding" (p. 92). Throughout most of Ross's article, however,

he conflates commonplaces with schema. What he calls commonplaces have the predictive power and emotional impact of what I call schema. The controversy over Anthem-kneeling best exemplifies how (self)schema can contain both the shared knowledge of a commonplace and powerful emotional resonance that affects perceptions, judgments, attitudes, and memories. Technical communicators may not typically deal with such sensitive issues, yet it is not uncommon for them to engage with potentially emotional topics such as climate change, vaccinations, or cancer research. For any topic, they communicate more effectively when they consider the audience's likely emotional (pre) disposition toward information.

The shared factual knowledge that Americans stand for the National Anthem is a commonplace. Assumptions about the meaning of standing or kneeling during the Anthem are schema. The schema that standing is patriotic and respectful generates predictions and perceptions that kneeling is unpatriotic, disrespectful, and unacceptable. Upon learning that kneeling is a form of protest against police brutality, one's self-schema as a patriotic conservative or a progressive social justice warrior will influence how one continues to interpret the jarring sight of Anthem-kneeling. Future exposure to images or references to Anthem-kneeling, Black Lives Matter, Blue Lives Matter, or similar information will trigger emotionally laden memories grounded in (self)schema, which, as noted, encompass both general cognitive frameworks (schema) and personal cognitive frameworks (self-schema). Distinguishing between commonplaces and schema based on predictive power and emotional resonance helps foreground the unique challenges of certain topics, information, or arguments.

It is also important to distinguish the framework of (self)schema from "framing." Framing issues, such as using "climate change" instead of "global warming," can place ideas in a certain context and influence how people view them, but I suggest that the (self) schema framework can also reveal the emotions that may affect how people notice, interpret, and encode information. Justifying Anthem-kneeling by clarifying its purpose as protesting police brutality, not the military, reframes the issue, but such framing did not persuade most opponents of Anthem-kneeling because it did not modify existing (self)schema for patriotism and respecting the military. The emotions attached to

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these (self)schema continued to color views of Anthem-kneeling. Comparing kneeling athletes to Vietnam veterans protesting the Vietnam War in the 1960s and 1970s may have persuaded some critics of kneeling by shifting the (self)schema affecting interpretations and memories, partly through activating a different emotional response. Today, those who protested American involvement in Vietnam are generally viewed as courageous people of conscience. The comparison with Anthem-kneeling not only reframes the issue; it also activates more positive emotions and thereby influences the schema for Anthem-kneeling. In the future, the modified schema will be recalled and will influence interpretations.

AUDIENCE ANALYSIS IN TECHNICAL COMMUNICATION

Ross (2013) provides a recent and excellent review of audience analysis literature in his article, "Deep Audience Analysis." He discusses several influential approaches to audience analysis: cognitive-based, intuition-driven, value-driven, classification-driven, feedback-driven, and multidimensional analyses. Cognitive-based approaches focus on individual readers and the rhetorical situation, considering a potential reader's concerns, knowledge, experiences, and attitudes. Intuition-driven approaches rely on conversations with audience-members and the construction of mental models of the audience based on those conversations, or what Ede and Lunsford (1984) call "audience-addressed" and "audience-invoked." Similarly, value-driven analysis identifies important social or community values by reviewing the written artifacts of a given community as well as interviewing audience-members. Classification-driven analysis consists of brainstorming about both demographics and psychographics (values, lifestyles, attitudes, personalities), and feedback-driven analysis applies usability testing by giving texts to readers and observing their reactions or obtaining their direct feedback (pp. 97–98).

Multidimensional approaches are the most comprehensive. As Ross (2013) says, "dimensionality allows for more complex views of audience than many prior methods" (p. 98). Dimensions may include the audience's knowledge level, need or desire for details, cognitive abilities, social factors, and cultural factors.

Readers/users also may be considered in terms of their roles, goals, or context of use, especially when analysis aims to create user personas, or archetypes of users (Coney & Steehouser, 2000, p. 29). Karen Schriver recommends limiting the dimensions to only expertise, motivation, and anxiety; limiting the dimensions makes applying one's audience analysis easier due to reducing cognitive load (Ross, 2013, p. 98). Ross notes that multidimensional methods are "wonderfully complex," yet their complexity is also their great disadvantage: "An author working with a strict timeline, under a strict budget, or without the means to collect or interpret that level of data [e.g., access to representative readers] cannot fully use these techniques" (p. 98). Additionally, such detailed, complex audience analysis work may be prohibitively difficult or time-consuming for technical communication classes, yet there is evidence that most employers view recent graduates' writing as subpar due to poor audience awareness (Droz & Jacobs, 2019).

To address the problem of complexity, Ross (2013) proposes a "deep audience analysis" (DAA) model that "generates a profile based on representative audience members' underlying rhetorical predispositions (their attitudes toward extremism, celebrity, etc.) and which rhetorical elements they might respond to in order to create a writing heuristic" (p. 103). To implement the DAA model, one needs "an information sheet, interview protocol, coding worksheet, classification worksheet, and a glossary accompanied by descriptive appendices" (p. 99). In Ross's testing of these materials, he found that users needed additional training on how to code the interviews and apply the results. While the DAA model is undeniably useful, its materials and methods involve a similar amount of complexity, time, money, and effort as other multidimensional approaches. Moreover, the DAA model was designed specifically for environmental communication and must be adapted for other rhetorical situations. It also assumes direct access to one's readers for detailed interviews (Ross, 2013).

In contrast, using the concept of "collective (self)schema" as a heuristic for analyzing audiences can balance the need for complex, multifaceted representations and the competing need for simple, limited conceptions that minimize cognitive load. By analyzing audiences in terms of (self)schema, technical communicators can simultaneously keep in mind a wide variety of dimensions and "rhetorical dispositions"

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(Ross, 2013, p. 103). The (self)schema framework not only emphasizes the demographics, knowledge, needs, goals, and contexts of the intended audience; it also generates insights into the predictions that may direct the audience's attention and its likely emotional responses to information. It is a highly flexible framework that can apply to virtually any audience. It can complement existing methods of audience analysis, or it can be used independently when constraints make more involved methods impractical.

ILLUSTRATIONS AND ANALYSIS

In this section, I will analyze two notable examples of engaging an audience's collective (self)schema. This analysis will demonstrate how the audience's psychological and emotional dispositions can be elucidated and tapped into through the (self)schema framework as well as how the strategies of engaging (self)schema (see Sentell, 2016) can be applied to assessing memorableness and creating more memorable, effective communication. I define *memorableness* as the characteristics that make information easy to encode into and retrieve from long-term memory. Communication can be effective without necessarily being memorable, but if information can be easily recalled or "triggered" when needed, then the communication is certainly more effective than something requiring repeated referencing.

The Uncle Sam Poster

The following poster illustrates the strategy of engaging an audience's collective (self)schema. Though broad in scope, the (self)schema framework does not merely describe any set of characteristics in a given text. It helps technical communicators identify specific content and strategies that will enhance a document's memorableness for a particular audience, in a particular context, compared to alternative content and strategies.

The Uncle Sam poster, hand sanitizer, and tissues were placed between elevators at the John J. Pershing Veterans Affairs Hospital in Poplar Bluff, Missouri (Figure 1). The "Uncle Sam" image is well-known in American culture, but it is especially familiar and relevant to military veterans and their family members. As Green (2010) says, "We pay attention to things our schema predicts" (p. 177). On a nonconscious level, people "predict" that images like Uncle Sam

might appear in a VA hospital; such images fit our expectations for the context. Other images might be equally or more attention-catching in terms of design, yet they may not be noticed, much less remembered, if the predictive function of our schema does not direct attention to them. In my original study (2016), for instance, the most frequently recalled documents in the high school hallway were posters that advertised local school clubs or that promoted sober driving. Such information was "predicted" by the subjects' schema for high schools. Less congruent documents were recalled much less often despite being more aesthetically appealing. The (self)schema framework helps identify what information will likely be "predicted" by a certain audience in a given context and how to make that information seem relevant and worth remembering.

The Uncle Sam poster also combines familiarity, novelty, "triggers," and practical value. Familiarity facilitates recall because the information is already

Figure 1. Uncle Sam Poster, John J. Pershing VA Hospital

present in one's schema and thus is easier to re-encode and/or retrieve. But the message here is not "I want YOU!" but rather, "Ask Our Staff … Did YOU Wash Your Hands?" The poster attaches a new message to a familiar image, using the intended audience's collective (self)schema to create a bridge between the familiar and unfamiliar. This makes the information more memorable compared to relying solely on imagery, design, or the simple statement, "Ask our staff if they have washed their hands." Additionally, the poster attempts to "trigger" the audience's memory of its message when a staff member enters a patient's room. The poster's message is most salient when one sees a nurse or doctor interacting with a patient, and the message is designed to be "triggered" by and at this moment. The (self)schema framework does not only identify strategies for facilitating encoding in a target audience; it also identifies strategies for prompting recall in that particular audience and its context. The poster also prompts concern about loved ones' care as well as subtly highlighting the importance of using the hand sanitizer conveniently located below the poster; it creates practical value for the audience. Locating the poster directly above the hand sanitizer increases the probability of achieving a secondary (or perhaps covert primary) purpose: prompting people to disinfect their hands before or after using the elevator.

Perhaps most impressively, the Uncle Sam poster places the audience in an emotional state of responsibility, if not obligation. When one thinks of asking the staff if they have washed their hands, it prompts consideration of one's own cleanliness, or lack thereof, and the potential impact on the veterans in the hospital, a group to whom most already feel they owe a debt. Americans possess collective schema for veterans as deserving reverence and self-schema as people who deliver it; they will act accordingly when these (self)schema and their emotional resonance are activated. The poster's content, location, and pairing with a wall-mounted hand sanitizer dispenser combine to activate the emotion-laden (self)schema that boost the likelihood of sanitizing one's hands. Awareness of the audience's collective (self)schema enables more effective emotional appeals, which in turn enhances both memorableness and influence.

The (self)schema framework leads to a broad perspective on a given audience, as shown by the above description of Americans as a veteran-loving monolith.

Yet, such generalizations are not only possible but also appropriate when one has a clear sense of purpose and context. Even radical critics of the American military will have schema that "predict" images like Uncle Sam in a VA hospital. Nonconsciously (Green, 2010), they will bridge between the familiar image and the novel message attached to it, adding to their schema for Uncle Sam. Seeing a staff member enter the patient's room will "trigger" recall before the critic realizes it. And it would be a radical critic indeed who has such a powerful negative emotional reaction to the poster as to disregard the care of the veterans whom that critic has come to visit as well as the cleanliness of his or her own hands after pressing the elevator button. The (self)schema framework offers an intuitive, holistic approach to analyzing audiences and tailoring communication to facilitate their noticing, encoding, recall, and action.

JFK's Man on the Moon Mission Statement

John F. Kennedy's famous "man on the moon" speech illustrates how words alone can engage a particular audience's collective (self)schema; his memorable call for a moon landing can be directly connected to the (self)schema framework in ways that the speech's more prosaic and forgettable appeals cannot. After a brief introduction, Kennedy told a joint session of Congress, "this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the earth" ("Excerpt," 2017). This speech may seem like an odd illustration for technical communication at first glance, but it is an excellent example of a mission, purpose, or objective statement. The stated goal functioned like "instructional information" in the sense that it guided NASA administrators, engineers, and other personnel as well as Congressional appropriations for the better part of a decade. Heath and Heath (2007) provide an insightful analysis of its effectiveness and relevance to professional communication:

Had John F. Kennedy been a CEO, he would have said, "Our mission is to become the international leader in the space industry through maximum team-centered innovation and strategically targeted aerospace initiatives." Fortunately, JFK . . . knew that opaque, abstract missions don't captivate and inspire people. The moon mission . . . was a brilliant and beautiful idea — a single idea that motivated the actions of millions of people for a decade. (2011, p. 21)

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Kennedy's objective statement engaged the audience's collective (self)schema as proud, industrious Americans who can accomplish anything. With this (self)schema, Americans "predicted" a response like Kennedy's moon-shot challenge. Such a challenge also held special emotional appeal in a post-Sputnik world in which Americans felt threatened by Soviet advances. Americans assumed they must do something to match or counter the Soviets. Something like landing on the moon, then, was "predicted" by the collective (self) schema involved in defending against communism at the Cold War's height. Given the perceived stakes, Americans deeply invested themselves in the resulting Space Race. Furthermore, Kennedy presented a science fiction idea (in 1961) with familiar imagery, bridging to the unfamiliar and captivating imagination, almost demanding that it be encoded, "triggered," and discussed. Simply looking up at the moon could "trigger" recall of Kennedy's speech, NASA's efforts, and the geo-political context of the Space Race.

I do not mean to suggest that Kennedy intentionally crafted his speech to make use of (self) schema. If he had, then the section about funding weather satellites would have been much different. Yet his intuitive oratory led to a central statement directly connected to the (self)schema framework. He understood that his audience would respond well to a challenge to "beat the Soviets" and reassert (the self-perception) of American preeminence, since their collective (self)schema already "predicted" such a response to Sputnik. He recognized that concrete, familiar imagery would convey the idea more memorably and create opportunities for "triggering" or activating recall. The (self)schema framework is quite broad in scope, but it is not a "catch-all" for any given communication or argument. It aims to help technical communicators analyze differences between appeals such as "landing a man on the moon" and funding weather satellites and craft communication that has more of the former's memorable impact.

IMPLICATIONS FOR AUDIENCE ANALYSIS

First, the concept of (self)schema can contribute to existing processes for analyzing audiences and developing personas. Second, (self)schema can be an independent framework for audience analysis. Using (self)schema as a framework for audience analysis

can balance the competing needs for complexity and simplicity. Technical communicators need complex, multidimensional representations of audiences, but they also must limit these representations and/or distill them into something simple enough to be applicable during the composing process.

Many companies, especially software firms, strive to balance simplicity and complexity by constructing detailed user personas, or "models that represent the typical — or archetypical — individual for whom communication designers create materials" (Getto & St.Amant, 2014, p. 30). Getto and St.Amant (2014) recommend a mixed methods approach of surveys, ethnographies, and interviews and/or focus groups to obtain the data needed for developing a user persona. Surveys collect demographic and attitudinal data, ethnographies gather behavioral data (e.g., how information or technology is used), and interviews or focus groups reveal why users behave or feel as they do. Each type of data could be interpreted in terms of (self) schema so that technical communicators gain more psychological insight into the audience or user. The (self)schema framework emphasizes the (self)concepts and values that help comprise a persona.

Half the subjects in my original study on memorableness (2016), for example, were in their late 30s to early 50s, were mostly female, and had many years of teaching experience. When interviewed, they often attributed a document's memorableness to its potential usefulness when interacting with students or their own children. They also said they seldom noticed posters or flyers day-to-day because they were usually "on a mission" while walking the hall rather than letting their attention wander naturally. The emergent persona might be described as a female, middle-aged, dedicated, busy, task-oriented teacher.

Adding the concept of (self)schema to the analysis draws attention to this audience's self-schema as helpful, dedicated teachers. Their self-schema "predicts" information that might enable them to help their students, so they are more likely to notice and encode such information even while "on a mission." Emphasizing the information's potential helpfulness can prompt the intended audience to view the information, once noticed, as personally relevant and worth remembering. Embedding "triggers" in the document — possibly through the collective familiar, unfamiliar or surprising details, or emotional appeals — can

make it more likely that the audience will recall the information at key moments, such as when a student asks about it.

The (self)schema framework can make valuable contributions to usability testing, market research, and other empirical methods that provide superior detail and depth in audience analysis. However, these more involved methods may be prohibitively time-consuming, expensive, or difficult. Creating detailed personas is an especially time- and resource-intensive process (Getto & St.Amant, 2014, p. 32). Many technical communicators may lack the training, time, money, resources, or access to audiences to conduct surveys, interviews, or focus groups, collect user feedback, or obtain market data. Moreover, the resulting audience data and/or persona may be too complex and cumbersome to be useful while composing. To avoid this difficulty, Schriver suggests limiting audience analysis to three or fewer traits (Ross, 2013, p. 98). Obviously, limiting the analysis reduces the utility of in-depth audience analysis methods, and arguably, defeats their purpose of generating rich audience representations.

I argue that the more intuitive, holistic (self)schema framework can be a strong alternative when needed, since it limits the scope of analysis but also enables complex representations. Since schema organize myriad details into a cohesive concept, they are ideal cognitive mechanisms or strategies for encapsulating a wide variety of variables and characteristics into a quickly grasped, easily-remembered whole that can guide analysis, design, and communication. Moreover, the (self)schema framework does not strictly require direct access to readers for interviews, feedback, or updating previous audience profiles or personas. Technical communicators can rely on their cultural, social, or institutional knowledge to construct an understanding of a given audience and its (self)schema, enabling them to forgo more time-consuming, expensive methods of audience analysis when they encounter training, time, or budget constraints. All heuristics have advantages and disadvantages, and the disadvantage of the (self) schema's broad scope is more than compensated for by the advantages of its facility and feasibility.

A SYSTEMATIC METHOD OF APPLYING (SELF)SCHEMA TO AUDIENCE ANALYSIS

I propose the following general questions as a systematic method of using the (self)schema framework for audience analysis:

- Who is the intended audience? Identify a concrete group or person.
- What is the audience's "collective familiar?"
- What is the audience's "collective unfamiliar?"
- What practical value for the audience exists in this information or product?
- What emotions will be triggered by this information or product?

Once the target audience is determined, answering the other questions can clarify its (self)schema. The answers can be derived from previous experiences with the target audience, consuming the audience's discourse, or reflecting on its collective experience and education. The following discussion expands on how the answers to these questions can be generated and applied to making more memorable, effective communication.

Once technical communicators identify a specific audience, they can anticipate the knowledge and experiences already present in its collective schema; familiar information is much easier to encode and can facilitate encoding unfamiliar information. An audience's "collective familiar" — or collective memory — often consists of widely-shared historical, social, or cultural experiences and teachings (Burke, 1969a, 1969b; Scott, 1999; Eves, 2005). To answer the question, "What is the audience's collective familiar?" a technical communicator could reflect on the audience's shared experiences and education. For example, the audience for the Uncle Sam poster consists of American veterans' families and friends. The Uncle Sam image taps into Americans' collective familiarity with the iconic WWII recruiting poster, which often appears in history textbooks and pop culture. Kennedy's audience also consisted of Americans, and the "man on the moon" mission statement used the American public's familiarity with Sputnik and other Soviet space achievements to imply the rationale and purpose of a moon landing. Both examples use schemas' "predictive" function to help draw attention and embed "triggers" within their respective contexts that serve their rhetorical purposes. They also possess the shared knowledge and emotional resonance of schema; one

connects patriotism, cleanliness, and care for veterans, and the other evokes awe and issues a challenge.

For internal audiences, an organization's mission statement, marketing slogan, or logo might facilitate the encoding of a document's information as well as elicit associated emotions about the organization. Collectively known titles, programs, acronyms, or jargon could also enhance memorableness. For external audiences, technical communicators may have to navigate wide-ranging backgrounds, experiences, or levels of knowledge or interest, yet there is usually some shared context that one can use to engage the majority of potential readers without confusing or leaving out the rest; everyone belongs to some discourse community, whether it is as broad as "environmentalists" or as narrow as "respiratory technicians." Americans of all stripes will recognize the Uncle Sam image, but if some do not, they can still connect to the image and its text. Even those unfamiliar with the image will likely "predict" the presence of patriotic-themed images in a VA hospital, making the information more attention-catching, memorable, and "triggering" than other documents.

If one has a strong sense of the intended audience's collective familiar, then one also has awareness of what the audience will find unfamiliar. According to Heath and Heath (2007), unexpected elements can "break" schema by alerting people to errors or inconsistencies. If people realize their schema are flawed, they usually want to amend them so that they better facilitate cognition and memory. Thus, the unfamiliar can be a mnemonic aid if it is presented as a knowledge gap. For example, the Uncle Sam poster creates an initial knowledge gap through dissonance; although such images are "predicted" by the audience's schema for the context, it is not clear why the image appears above hand sanitizer between the elevators until one reads the unfamiliar message. The familiar image bridges to the unfamiliar message, which then prompts conscious revision of the schema and encoding into long-term memory. Kennedy's goal of sending a man to the moon created a knowledge gap to the extent that people wondered if it was possible. Unifying two familiar images, "man" and "moon," in an unexpected way prompted people to revise their existing schema for each.

By nature, people strive to encode ideas with practical value (Berger, 2013). In many cases, practical value may be obvious to a specific audience due to its

context, needs, or (self)schema. A user who encounters a problem with a software application will find inherent value in an FAQ, Help, or tutorial document. Yet, practical value may vary according to the audience's needs and goals, necessitating understanding the audience's collective (self)schema. That is, what practical value exists in this information for this audience? The Uncle Sam poster creates practical value by highlighting the importance of cleanliness in caring for patients and sanitizing one's own hands at the elevator. JFK's speech tapped into the desire to match or exceed Soviet advances, providing practical value in the otherwise impractical mission of shooting a passenger rocket to the moon. In my previous study (Sentell, 2016), the teachers reported recalling certain posters and flyers because they thought students might ask about their information, such as the dates of upcoming ACT exams or club meetings. By analyzing the audience of teachers in terms of collective (self)schema, a technical communicator could further enhance the information's memorableness (and effectiveness) by emphasizing its practical value for answering students' questions. Analyzing students' collective (self)schema might lead to added information about the importance of the ACT to attending college or the benefits of membership in a given club, rather than merely stating the dates of the upcoming ACT exams or club meetings.

Schema can help identify the audience's existing emotions for a given topic and thus what affective responses technical communicators might use, create, or avoid. Emotions influence how people encode, recall, and share information. Arousing emotions like excitement, awe, anxiety, or anger make people want to take action, including sharing whatever produced these stimulating emotions, whereas people are less likely to share information that causes less-stimulating emotions like contentment or sadness (Berger, 2013). To share something, one must first attend to and encode it. Arousing emotions, therefore, can make information more engaging and memorable. While I do not advocate inappropriate emotional appeals, I argue that technical communicators can tap into existing emotions and/or evoke emotions that make information more personally relevant and more likely to be encoded.

As Dragga and Voss (2003) make clear, the appropriate use of emotion can enhance information's impact and help the document achieve its intended

purpose. In "Hiding Humanity," they argue that accident reports could be more effective if they humanized victims: "the deliberate omission of the human element in the interest of scientific objectivity actually defeats its purpose by communicating an incomplete picture" (pp. 78–79). Humanizing victims, however, makes the report's recommendations more likely to be taken seriously. To better prevent germ transmission, the Uncle Sam poster activates the audience's emotion-laden schema for veterans in general and their loved ones in particular. To motivate Congressional appropriations and public support for the Space Race, JFK simultaneously tapped into anxiety about the USSR and the sheer awe of a moon-landing. Asking, "What emotions will be triggered by this information or product?" can facilitate creating such powerful appeals.

Awareness of the audience's collective (self) schema facilitates careful attempts to marshal the reader's existing emotions in support of one's rhetorical purpose(s) and to create new emotional registers when needed. As Ross (2008) found, people have a range of intellectual and emotional responses to ideas such as "Al Gore" or "the environment." People with (self)schema as political conservatives will likely react negatively to a document that promotes reducing consumption of single-use plastics, regardless of the information's merit, due to their association of environmentalism with progressive politics and politicians. Conversely, advocating nuclear energy may be a harder sell for environmentalists than solar and wind power no matter how compelling the arguments.

Activating new (self)schema for emotionally charged topics stands a greater chance of success. Conservatives may be persuaded to buy reusable plastic bottles if the document activates (self)schema for fiscal responsibility by portraying the bottles as a money-saving measure, and environmentalists might be more supportive of nuclear energy if their (self)schema for reducing carbon emissions were activated. Grounding arguments in the audience's values has been found to be more persuasive than couching them in one's own values (Feinberg & Willer, 2015, p. 1676). The framework of (self)schema helps rhetors to identify and appeal to those values and their associated emotions.

For another example of using (self)schema to navigate an audience's affective responses, Droz and Jacobs (2019) found that the majority of employers in their local area perceived new employees' writing as unprofessional. Droz and Jacobs correctly interpret the underlying issue as a lack of audience awareness among the new employees. If new employees have more developed schema for their organizations and their communicative norms, then they can more effectively activate positive emotional reactions and avoid eliciting negative responses. Companies have distinctive practices, personalities, and cultures, and the various members of a company or organization may vary among each other in each of those facets depending on their demographics, rhetorical or emotional dispositions, cultures, values, beliefs, assumptions, attitudes, expertise, interests, authority, anxieties, roles, goals, context of use, and so on. Well-developed schema for the company and its departments, teams, or individuals can bring these many complex dimensions into a cohesive, unified whole, enabling writers to simultaneously model complex readers and simplify those models so that they are useful to composing.

CONCLUSION

Schema can be very useful for analyzing audiences and crafting more memorable communication. The "predictive" function of schemas means that some images and information will be more attention-catching and memorable for certain audiences and contexts than other stimuli. Embedding likely memory "triggers" into communication based on an audience's (self)schema in a given context can facilitate recall at key moments. Familiar information taps into existing (self)schema and bridges to the unfamiliar, which can be incorporated into revised (self)schema. Conveying practical value aids encoding, and the (self)schema framework gives insight into how to emphasize information's practical value for a given audience. Understanding the audience's (self)schema helps with anticipating, using, or creating emotions that influence perceptions, memory, and behavior.

The (self)schema framework offers an intuitive, holistic approach to audience analysis that can complement existing methods of audience analysis and persona development or serve as an effective alternative when more in-depth methods are impractical. It can be applied systematically with a few generative questions and one's direct experience with an audience, reading or listening to its discourse, or reflection on

its common experience. Through organizing myriad details into a cohesive, easily remembered whole, (self) schema balances the complexity of multidimensional representations of audience with the simplicity necessary for effective application during the composing process. In turn, using (self)schema for audience analysis facilitates identifying and applying specific rhetorical strategies that can engage a particular audience's collective (self)schema. Complexity and simplicity balance.

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Review of Three Books on Science Writing

By Julie Kinyoun

INTRODUCTION

Among scientists, communication is a critical component of individual and corporate success; among laypeople, science communication is the conduit to a society more positioned to make educated, informed decisions. The intersection of these two cultures is a middle ground of concerned citizens who realize there is an increasing gap between the assumptions, general knowledge, and expectations of the two groups. As scientists struggle to publish data, win grant money, and maintain their respect with the public, the rest of us must attempt to run daily lives with some awareness of how science affects our very being: from the energy use in our homes and cars, to the medicines and foods we feed our children, and the choice of how to vote in public elections.

Many of our seemingly mundane, everyday choices and actions are influenced, to a certain degree, by basic science. It becomes more important that people at all educational levels have access to informed, accurate, and honest analyses of data created from scientists of integrity. To this end, three short books were written by authors of varying scientific backgrounds on the same topic: how to think and write about science in a clear, communicable and appealing way for increased funding, efficient collaboration, respect, prestige, and public awareness.

SCIENTIFIC WRITING = THINKING IN WORDS, SECOND EDITION
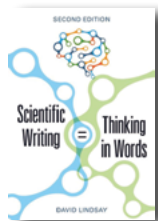
This 166-page book covers every section of a scientific paper in almost excruciating detail, perfect for a beginner. It would also be useful for scientists who are English language learners or for a scientist who was trained before the digital explosion of the last 20 years.

David Lindsay explains in the Preface the need for updates to his 2020 book. Aside from the more global focus resulting from the electronic era, he acknowledges some progress from the mentality of research writing from the Preface in his 2010 edition, "It means that the over-formal and often pretentious style of older writing that made writing challenging for researchers is now more relaxed and less threatening for native and non-native English speakers alike . . . In short, people are recognizing that being understood is far more important than being impressive" (p. vii). Lindsay is a researcher himself, which is abundantly clear as he walks his readers through the process of a scientific paper: from formulating the original hypothesis to submitting it to a journal—this is the first 100 pages of the book. Other important science communication responsibilities of a scientist are in the last section and include oral presentations, posters, literature reviews, theses, and grant proposals. One tiny chapter near the end focuses briefly on science communication for a lay audience.

If a scientist is presenting or submitting research for the first time, *Scientific Writing = Thinking In Words* would be an excellent springboard from which to launch.

THE SCIENCE OF COMMUNICATING SCIENCE: THE ULTIMATE GUIDE

In contrast to David Lindsay's approach, Dr. Craig Cormick approaches science writing from the perspective of a journalist. His focus is on communicating science to an increasingly distrustful public who view science from a skeptical glance. Each chapter begins with a pithy quotation from a famous person, movie or book that introduces his main point for that chapter. This is a brilliant strategy to demonstrate a point that weaves its way throughout the entire book: science is part of everything we do.

In his chapter specifically about politics and policy, he starts with a quotation by Maureen O'Neil, former President and CEO of International Development and Research Centre. "In development

Julie Kinyoun

research, to get a new discovery into policy and practice is just as important as the discovery itself" (p 132). In communicating science, you should gauge the likelihood that your audience will value and respect the data and conclusions you are presenting. Success in conveying a message will largely rely on an understanding and ability to gear that message to the values of a given audience.

Cormick's focus on metaphors, simple illustrations, storytelling, and use of media is the strategy of how he proposes to win the public to a science perspective. Unfortunately, he assumes that the world of scientists is always correct and does not propose ways of testing that credibility.

Another drawback of his approach is that if you want a quick reference, you must sift through his storytelling and interweaving of topics to get to a main point. For this reason, it is not particularly useful for a beginner. The audience for *The Science of Communicating Science: The Ultimate Guide* is a rather narrow group of people who already grasp basic science and have at least dabbled in science communication. His own skepticism is slanted toward the public and he omits an examination of the quality of the science when looking at effectiveness of science communication. This book is for you if you are confident of your scientific message and want to learn how to effectively convey it.

THE CRAFT OF SCIENCE WRITING: SELECTIONS FROM THE OPEN NOTEBOOK
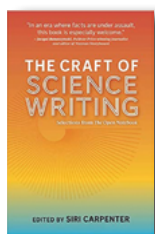
This nearly 300-page book is a compilation of essays, interviews, step-by-step instructions, and other writing tidbits compiled on a web site called "The Open Notebook" founded in 2010 by Siri Carpenter. What developed into an online science writing community started as a web page run by two graduate students interested in transitioning their bench science careers into science writing.

The Craft of Science Writing: Selections from The Open Notebook is divided into five parts: becoming a science journalist, finding science stories, reporting science stories, Storytelling, and building expertise in your subject. Each chapter within a section is written by a specialist explaining their area of expertise. One difference between this book and other books geared toward science advocacy/lobbying is that amongst the storytelling and appeal of science journalism, this community holds a healthy skepticism toward scientists themselves.

Three chapters of the nearly 40-chapter book cover topics specifically related to making sure the science being reported is sound science. "How to Read a Scientific Paper," "What are the Odds," and "Spotting Shady Statistics" allude to the idea that before reporting a new study it is important to examine the science and even read the published paper. Sometimes the scientists themselves are at fault in disseminating poor information—whether in just faulty analyses and conclusions or even, in some cases, shady and dishonest results.

In the end, *The Craft of Science Writing* reads like a guest-artist feature in every aspect of science journalism. This book would be an excellent addition to a graduate program in any science subject or even a small-group journal club for undergraduates.

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Lindsay, D. (2020). *Scientific Writing = Thinking in Words, 2nd ed.* CSIRO Publishing. [ISBN 978-1-4863-1147-7. 180 pages. US$24.50 (softcover).]

USING SCHEMA

	Scientific Writing = Thinking in Words	**The Science of Communicating Science**	**The Craft of Science Writing**
Audience	Beginner Scientist/English Language Learner	Advanced Science Communicator or Science Advocate	Intermediate to Advanced Science Writer
Major Strengths	Detailed Breaks scientific paper into component parts and dissects each one Updated to include current and more informal tone for scientific writing	Focused on persuading different types of audiences to see the scientific angle Excellent use of metaphors and images from books, movies, and popular culture to explain science	Anthology of anecdotes, step-by-step instructions and more complex explanations told by specialists in each area Told from the perspective of both scientists and journalists
Major Weaknesses	Not much information about writing for audience without a science background	Emphasizes negative bias of public toward science too much Doesn't consider that some science is shoddy and worthy of scrutiny	Too dense with information on a wide variety of topics from storytelling leading to statistics- it seems more like an introductory or even advanced class in a book form
Comments	Good for a graduate thesis or introduction to submitting a scientific paper to a journal	Not for use as a quick reference Assumes mastery of science by the communicator Excellent for a lobbyist or grant presenter	Good for a scientist or journalist trying to communicate science to a lay audience
Rating	****	****	*****
Cost	$24.50	$39.95	$24.95

Books Reviewed in This Issue

Adventures in English Syntax

Robert Freidin. 2020. Cambridge University Press. [ISBN 978-1-108-78179-4. 202 pages, including index. US$26 (digital).]
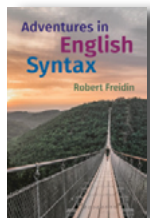
Adventures in English Syntax was written by a linguistics professor "for anyone who wants to become a more effective writer, a more perceptive reader, and a more precise thinker" (front matter) by understanding English sentence structure. Robert Freidin progresses from defining syntax and syntactic units to analyzing complex syntactic expressions. His plan in writing the book was "to start with the words in the Dr. Seuss title, which is at first sight deceptively simple, and proceed to . . . complex sentences, questions and finally to ellipsis" (p. xii).

Each chapter title in *Adventures in English Syntax* provides the phrase or sentence that serves as a springboard for Freidin's analysis. In Chapter 1, he closely examines the title of Dr. Seuss's *One fish two fish red fish blue fish* to uncover the source of its ambiguity. In Chapter 2, Freidin illustrates how conjunctions can add to ambiguity. In Chapter 3, he clarifies why the prepositional phrase in the title of his own course caused confusion. In Chapter 4, Freidin untangles prepositional phrase modifiers. Chapters 5 through 8 examine sentence structure: syntactic unit displacement in 5; analysis of Jane Austen's writing in 6; ambiguity of syntax of questions in 7; and the phenomenon of ellipsis in 8. Each chapter ends with a summary.

The author draws on examples not only from Dr. Seuss and Jane Austen, but also from linguist Noam Chomsky, and grammarians such as Strunk and White, Henry Fowler, and Lynne Truss, among others. These authors provide both good examples of syntactic structure (Austen) and questionable examples of grammar rules not to be violated, such as avoiding passive voice. Freidin's hierarchical sentence analyses refute the soundness of these rules.

This is not an easy read nor is it a grammar reference book to be consulted on the fly. Freidin states that the book "requires no prior knowledge of either linguistics or traditional grammar" (p. ix). He does go step-by-step through his thought process, extensively diagraming his examples while defining many terms. But his thought process can be somewhat convoluted, with the introduction of many unexplained terms, possibly leaving a novice reader confused. Although

Freidin does not introduce *Adventures in English Syntax* as a text for course work, it does seem suited to that purpose. Indeed, in his concluding comments, Freidin states that incorporating what he has discussed in the book "into the curricula of high school English classes and college writing courses" (p. 191) would be beneficial.

Reading this book is good reinforcement for any technical writer. Freidin's continued emphasis on avoiding ambiguity and redundancy in sentence structure combined with his focus on understanding how each word contributes to building that structure remind us to be more careful, precise writers.

A glossary, bibliography, and index are supplied at the end of *Adventures in English Syntax*.

Linda Davis

Linda M. Davis is an independent communications practitioner in the Los Angeles area. She holds an MA in Communication Management and has specialized in strategic communication planning, publication management, writing, and editing for more than 25 years.

Narrative Change: How Changing the Story Can Transform Society, Business, and Ourselves

Hans Hansen. 2020. Columbia Business School Publishing. [ISBN 978-0-231-18442-7. 208 pages, including index. US$27.95 (hardcover).]

Narrative Change: How Changing the Story Can Transform Society, Business, and Ourselves concisely explains narratives and outlines the ways they influence decisions ranging from mundane go-to behaviors to life changing situations like putting someone to death. Hans Hansen's book focuses on his success implementing a new death penalty narrative in Texas. By intertwining examples that range from his personal experience with addiction to corporate-sponsored comedy skits, he demonstrates several different examples of the narrative change model.

Narratives are the instruction manuals our brains write for unfamiliar situations. People glean behaviors from all sorts of situations including observing family, interacting in communities, and watching television. Hansen writes about a "dinner and a movie" first date narrative. People follow this example for first dates

because they see their friends do it or they see similar scenarios on television.

Constructing a new narrative begins with thorough evaluation of the narratives you want to replace. "We rarely stop to think about why we think the way we do" (p. 53). Hansen's team in Texas constructed several mini narratives to reduce the number of people put to death in Texas. Each one began by deciding on the new narrative and then deconstructing the narratives they wanted to replace: "We become hyperconscious of why we are doing things the way we do, and cease to accept 'because that's the way it's always been done' as a legitimate rationale" (p. 114). For example, the team entered more than 80 pretrial defensive motions knowing the judge would deny most of them; replacing the existing *don't annoy the judge* narrative. Their new narrative was *perfect the record* (p. 96). Hansen described it as leaving breadcrumbs for the Supreme Court. He called the breadcrumbs lifelines for the defendant. If a future higher court ruled part of the death penalty unconstitutional in this case or any other, this defendant could appeal his or her ruling because a motion relating to the same issue was denied at the pretrial hearings. If the defense team had not entered a motion relating to the issue that was overturned, this defendant could not appeal.

Narrative Change captures your attention, provides a balance of heartbreaking and gory details, and makes you think. Hansen doesn't ignore the crimes the men in his book are charged with; he doesn't glorify them. He uses a life-and-death situation to explain how humans process information. This book is an easy read, but it may color the way you look at narratives in your own life and beyond for years to come.

Stephanie Saylor
Stephanie Saylor is a senior technical writer and CACI outreach coordinator. She received her master's degree in digital communication from Johns Hopkins University.

Life After Privacy: Reclaiming Democracy in a Surveillance Society

Life After Privacy: Reclaiming Democracy in a Surveillance Society talks about how privacy in our personal lives is being intersected by a more democratic surveillance society. Privacy is "that purifying element that allows citizens to exercise consent, and be free in the state" (p. 117). While technical communicators may find this of interest, it does bring to one's thoughts that we should be more aware of what privacy we choose to share. As writers, our words are powerful and not easily forgotten.

Firmin DeBrabander's book covers privacy in eight chapters: the confessional culture (1); how to defend our privacy (2); where big data and its plans fit (3); what the surveillance economy is (4); a history lesson on privacy past and present (5); the borderless, vanishing self (6); and the final two chapters covering autonomy, political freedom, and the power that politics holds. While the book's contents seem interesting, I found it to be more a treatise of DeBrabander's position of the democratic society itself. Yet, I did find nuggets of information.

DeBrabander says that we "instinctively share the most intimate, sometimes embarrassing, or even offensive comments, images, and opinions" (p. viii) about ourselves, family, and others. Depending on your position, we should reconsider the "what" we choose to share with others. Some protection is needed when sharing about family, especially regarding our youth. Americans are quick to divulge our personal data regardless of media, while Europeans are more protective of what they share or will allow to be shared or collected about them. The Europeans have the GDPR (General Data Protection Regulation) law that protects their rights, while in the US only the state of California has their own CCPA (California Consumer Protection Act) law to provide its citizens specific rights to what can be shared or provide a way to opt-out of services.

DeBrabander says, "Digital communication is mediated communication . . . it is the computer or smartphone screen before me" (p. 17) that serves to remove one from thinking about what we share openly

in public. Online does not protect but exposes as it often does not "go away." Privacy within the digital media relies on our own initiative to "act and speak as if no one is watching, or . . . looking directly at us—or no one knows our identify" (p. 160). One cannot hide as identities are discoverable, so should we be aware of what is being shared and stand firm in our beliefs regardless when online or when speaking in-person. That's a discussion that leads to how much privacy are you willing to sacrifice.

Overall, *Life After Privacy* was an interesting read if you want to explore the world of the Greeks (Socrates and Plato), get a history lesson of democracy through the ages, and learn some information to make you think about what you post before posting it. Finally, be aware of what you are sharing, know how it may impact you, and be careful when sharing about your family.

Jackie Damrau
Jackie Damrau is an STC Fellow with more than 25 years of technical communication experience. She serves as the book review editor for the *Technical Communication* journal and is the 2020–2021 STC Education committee chair.

News 2.0: Journalists, Audiences, and News on Social Media

Ahmed Al-Rawi. 2020. Wiley Blackwell. [ISBN 978-1-119-56966-4. 210 pages, including index. US$44.95 (soft cover).]

News 2.0: Journalists, Audiences, and News on Social Media is an edited collection of previously published papers by Ahmed Al-Rawi. As such, there is some repetition of explanations for the social science/media studies concepts used. Each chapter is essentially a study report on an investigation by Al-Rawi about an aspect of the topic. The reports are grouped into four main sections: content, audiences, (news) producers, and mobile news (apps). Here news producers are not just mainstream media outlets, but also people (re)posting information on social media platforms, primarily on Twitter, Facebook, and YouTube.

Quite pertinent at the time I write this (September 2020), one chapter explores the impact celebrities and social media gatekeepers, such as influencers, have on the dissemination of false news. At the same time, trust in mainstream media seems to be eroding in the US,

Al-Rawi notes. He cites a Gallup survey that found 53% of respondents trusting mainstream media in 1997 and 32% in 2016. While Al-Rawi only analyzes text, it would be interesting to study the impact on public opinion of the distribution of false images— manipulated charts, altered photos and the like—on social media.

Another theme that emerges in Al-Rawi's research is the mismatch between the types of topics with which social media users engage and those prioritized by news organizations. He compares the types of stories that appear on news media's home or front pages with those most frequently reposted or commented on. There are differences among the social media platforms, but generally readers engage more with "soft" news while front page stories tend to be "hard" news about specific events or trends.

The cultural context of social media interactions is also important. For example, in Arabic-speaking countries, religious words and phrases are common in everyday discourse. They do not necessarily denote that the speaker (or writer) is particularly religious. The same is true elsewhere. In Austria, where I grew up, the standard greeting is "Grüß Gott!"—literally, God's greeting. It is used by everyone, even atheists. Awareness of such customs is important when parsing social media interactions for both overt content and subtext.

Unlike most research published in English, Al-Rawi also considers mainstream and social media published in Arabic and outside industrialized nations. He calls for additional research involving a greater variety of international media. Since most of his studies were conducted, new social media platforms, such as TikTok, have emerged. Investigating the news discourse in these forums could be another fruitful research avenue.

Barbara Jungwirth
Barbara Jungwirth writes about medical topics (www.bjungwirth.com) and translates medical and technical documents from German into English (www.reliable-translations.com). She has written for print and online media since her high school days and majored in media studies. You can find her on Twitter at @bjungwirthNY.

Managing Your Research Data and Documentation

Kathy R. Berenson. 2018. American Psychological Association. [ISBN 978-1-4338-2709-9. 108 pages, including index. US$29.95 (softcover).]

Modern research is increasingly complex, and generates copious, complex research data and associated support materials, such as database search results and the paperwork required to obtain institutional review board (IRB) approval. Organizing this data represents a formidable challenge, particularly for new researchers or research groups. In addition, it's increasingly necessary to archive data in ways that let future researchers replicate or validate a study. Finally, errors must be eliminated during data collection and management because they have significant consequences for both human lives and future research. Kathy Berenson's *Managing Your Research Data and Documentation* provides concise, logically structured, and invaluable advice on how to accomplish these goals.

Berenson summarizes her goals as teaching you how to manage project files, manage your data (safeguarding original data, detecting and correcting data-entry errors), document your research and analysis methods (including your data-processing algorithms), and prepare replication instructions to guide future researchers (data descriptions, such as metadata; instructions for how to handle missing data). She devotes a chapter to explaining the key aspects of each subject with appendices that provide additional details. Though most examples focus on the widely used SPSS software, they should be easy to translate into other software.

The writing is clear, concise, and practical. It includes essential advice, such as how to develop a hierarchical structure for storing and managing all of a project's information, protecting original data against inadvertent modification, standardizing variable names and analytical methods, clearly documenting everything you do (especially protocols for compiling and processing data), and dealing with the inevitable problems that arise as you process a collection of data. Berenson repeatedly emphasizes the importance of protecting the privacy of study participants, copyright considerations, and (implicitly) protecting proprietary information.

One thing that would benefit from more detail is how to characterize a study population sufficiently well that future researchers who try to repeat your study can choose a comparable population. Differences between populations are a major source of the replicability crisis that affects most research, but particularly in the social sciences. Although this is, in fairness, better suited to a research design book, it's sufficiently important for replication that it should have been handled explicitly, with examples of how researchers inadvertently fail to control their selection of research participants. A more serious omission is detailed instructions on how to back up one's data; relying solely on an employer's overworked computer staff is unwise. A good backup strategy should include near-line (on a flash drive), offline (on DVD), and cloud-based backups. I would also have liked to see a section on documenting "lessons learned", so future researchers can avoid repeating your mistakes. As in previous books I've reviewed in this series, the index is primitive.

Whether you're just getting started in research or are finding that you need help managing your research, *Managing Your Research Data and Documentation* is well worth your time.

Geoff Hart

Geoff Hart is an STC Fellow with more than 30 years of writing, editing, translation, and information design experience. He is the author of two popular books, *Effective Onscreen Editing* and *Writing for Science Journals.*

change to LIVE better & LEAD differently

RobRoy Walters. 2020. Clovercroft Publishing. [ISBN 978-1-950892-15-0. 188 pages. US$14.99 (softcover).]
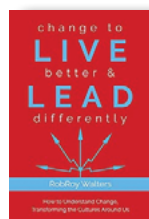
Whether you are in industry as a project manager or in academics as a department chair, any manager knows that the only constant is change. This rule is as true in technical communication as it is in banking. For example, just as academics thought they had a firm handle on what students wanted out of online courses, the COVID-19 pandemic began, forcing even the most stalwart opponents of virtual learning in front of the camera and computer for video lectures. Fortunately, RobRoy Walters has useful advice for us in his newest book, *change to LIVE better & LEAD differently.*

This is Walters's third book in a series about management, transformation, and change. In this installment, he focuses on the power of change and its opportunities for leaders. In Walter's opinion, there are two main cultures of dealing with change: the culture of "Do," or the traditionalists and the culture of "Why," which represents the more creative thinkers. Each culture has its advantages and disadvantages, but a buffer must be found between the two or sweeping change will cause a major upheaval, which Walters likens to a tsunami (p. 51). Many in academics as well as in industry have seen these types of rapid changes in action, often accompanied by a rapid staff turnover.

Although *change to LIVE better & LEAD differently* is set in the banking world, its lessons are meant to be applied anywhere leaders can be found. I found myself nodding my head and chuckling at several passages and scenarios that reminded me of experiences I have had in academics, where the same problems with leadership can occur and the same tension between new ideas and traditionalism exist. As an academic, the advice I most appreciated from the book was the tips on working smarter. Too often in technical communication we measure devotion to our job by the hours we put in instead of our productivity, especially in academics. It is refreshing to see a successful management expert tell us to work in ways that make us "better" rather than simply more present in the office.

One of the greatest strengths of Walters's book is his conversational tone and dry sense of humor. He illustrates his advice with scenarios from his life in banking, taking the reader along with him in board meetings and private conferences that makes you feel like a confidante rather than a client in a lecture. I was surprised by how much I enjoyed reading his anecdotes and advice for being a better leader, influencing people, and obtaining a better work/life balance.

change to LIVE better & LEAD differently is the ideal book for anyone starting a leadership or management position, as well as new graduates embarking on their careers. The beauty of Walters's text is that it is simple to understand, enjoyable, and can apply to virtually any field. If a management book for "everyone" exists, this is the one.

Nicole St. Germaine

Nicole St. Germaine is a Professor in the Technical and Business Writing Program at Angelo State University, as well as a freelance writer and consultant. Her research interests include technical communication for a Mexican American audience and technical communication in the health fields.

Zoom For Dummies

With the COVID-19 pandemic in full force as of this writing, the virtual meeting software Zoom has become a vital tool for workplace and personal communication. So, the publication of Phil Simon's book is good news.

The author is fully aware that the application is rapidly changing: "Zoom adds new features on a regular basis" (p. 3). His details about features are good as of June 2020; the details I see on my screens are good as of September 2000. Thus, the book doesn't allude to features introduced in the past three months, such as Zoom for Home, skin smoothing, much more effective lighting adjustment, noise cancellation, new ways to customize background pictures, methods for combatting "Zoom-bombing," and the ability to overlay video on PowerPoint or Keynote slides, not to mention dozens of behind-the-scenes improvements for developers. (For updates on new features, follow https://zoom.us/whatsnew.)

Does this mean that the book is essentially useless? I don't think so. If you're new to Zoom, you have the details necessary to get started. Simon explains in detail the philosophy of Zoom, setting up Zoom Rooms, hosting meetings, using mobile devices, recording and replaying videos, sharing your screen, and much else.

The most useful chapter for STC readers may be the one on creating webinars, which includes details on registering and removing attendees, handling questions and polls, assigning alternative hosts and co-hosts, and sharing and annotating your screen. Liberal use of tables and screenshots makes the information easy to grasp.

Zoom For Dummies is good, but not perfect. If you just want to begin Zooming because someone has emailed you an invitation to a Zoom meeting, you must get past 40 pages of introductory material. Clearly, the

book needs an easy-to-find quick start section. And the proliferation of features alluded to earlier means that you must go beyond its pages to realize many usability and security benefits.

The major problem is that Zoom is fully documented online by Zoom staff, various institutions, and users. Simon refers in passing to "Zoom's robust help center" (p. 350), which in fact is a deep, masterfully organized system offering hundreds of pages of quick start guides, video tutorials, and detailed discussions of specific topics at all levels of expertise.

So, do you need a book like *Zoom For Dummies*? That depends. If you want a book that hits major points, this is a reasonably good choice. For most of us, unfortunately, the Zoom help center serves us better.

Avon J. Murphy
Avon J. Murphy is an STC Fellow and technical editor in western Washington. A retired college professor and government writer, he is a contractor and principal in Murphy Editing and Writing Services, specializing in computer and Web technologies. Avon served as book review editor for *Technical Communication* for 17 years.

Design for Cognitive Bias
David Dylan Thomas. 2020. A Book Apart. [ISBN 978-1-937557-97-3. 108 pages, including index. US$24.00 (softcover).]

Bias is something that affects everyone, whether they realize it or not. Maybe an employer seems to hire people of a specific gender or ethnicity more often. Or maybe people purchase products which have an advertisement image that uses certain lighting or arrangement. Perhaps you even have a preconceived notion of what bias is. In *Design for Cognitive Bias*, David Dylan Thomas explores how your mind works and guides you towards making decisions without your realizing it.

In his book, Thomas breaks down how cognitive bias works. The first chapter discusses user bias and how people make decisions in an often-irrational way, even if they do not realize it. He writes in an engaging style that pulls in the reader and uses pop culture references in the headings to both add levity and convey concepts. After exploring the inherent biases in your mind, Thomas delves into designing content to meet

those biases. To demonstrate such biases, he displays two advertisements for the same lamp, with the only difference being the alignment of the lamp in the photo. Images with the lamp on the left were perceived as "classic-looking," while the images with the lamp on the right were viewed as "modern-looking," despite the lamp being identical in both images. Retailers have done studies on such concepts and create their commercial images accordingly. Further into the book you learn how not only do the customers have biases, but the producers do as well. When crafting a survey, the phrasing of a question may lead the customers to a response. For example, the survey asking, "Should this person be driving a car?" may push the survey taker towards a certain response. Last, now that the book has examined both user and stakeholder bias, it encourages the reader to reflect inward to learn about their own biases.

Included throughout the book are examples and illustrations which ably assist in conveying the concepts being presented. While some are charts or graphs, many demonstrate real life examples, such as a comparison between a train timetable and the more modern phone app. Combined with rich, storied examples, and congenial but professional dialogue, *Design for Cognitive Bias* is an enjoyable read. Keep in mind, though, that opinion is certainly biased.

Timothy Esposito
Timothy Esposito is an STC Fellow, the STC Secretary, and a past president of the STC Philadelphia Metro chapter with more than 20 years of technical communication experience. He has served in his chapter as chapter vice president, treasurer, webmaster, and scholarship manager.

Webcomics
Sean Kleefeld. 2020. Bloomsbury Publishing Plc. [ISBN 978-1-350-02817-3. 254 pages, including index. US$32.95 (softcover).]

Historically, comics have been a form of print media appearing in newspapers and comic books. Many people have fond memories of reading *Peanuts* or *Calvin and Hobbes* from their Sunday newspaper, or perhaps picking up the latest *Spider-Man* or *Superman* comic book from a shop. While those forms of

media still exist, the Internet boom has given comic artists many more options than were available to their pen and paper predecessors. *Webcomics* is a study in the history and growth of comic, an examination of the cultural impact of webcomics, as well as several case studies on popular webcomics.

Kleefeld begins with a history of the comics industry for the reader to understand how webcomics exist in today's culture. He moves from business models for traditional print comics, to a study of how different comic artists developed profitable systems for producing content only on the web. Many well-known comics, such as *Penny Arcade,* are discussed either in passing or as a direct focus. *Penny Arcade* is an impressive example of how a webcomic influences pop culture. It grew from a small webcomic to running a series of game-themed conventions (Penny Arcade Exposition, or PAX) across the country. Not all webcomics share in that success, and many are passion projects from their creators. While some are one off gag strips, many are serialized stories, or a balance between the two styles. Several webcomics, such as *Questionable Content* and *Girl Genius,* are discussed, examined, and analyzed. Such a discussion may peak the reader's interest to try other webcomics that are new to them. The book wraps up with a discussion of webcomics as a genre, defining success for a webcomic, and how more creative control affects the comic's creator.

While the concept of comics may be considered a juvenile topic by some, Kleefeld takes the matter seriously. *Webcomics* is not a light, casual read as you might expect, but a serious academic study into the online comic industry. Sample images are scattered throughout the book, and numerous comics are mentioned. A thorough index lets you find all those references, no matter how obscure they were in the text. If you would enjoy learning how the comics business evolved and modernized with the internet, then *Webcomics* may be the print book which inspires you to read online.

Timothy Esposito

Timothy Esposito is an STC Fellow, the STC Secretary, and a past president of the STC Philadelphia Metro chapter with more than 20 years of technical communication experience. He has served in his chapter as chapter vice president, treasurer, webmaster, and scholarship manager.

Resilience: 10 habits to thrive in life and work

Looking back on 2020, how have you reacted to the COVID-19 situation? The news media has mentioned the increasing numbers of suicides and rates of depression during this time. Is there a way to thrive in our current situation?

In his book, *Resilience: 10 habits to thrive in life and work*, Jo Owen includes 45 exercises to enhance our resilience. *Merriam-Webster* defines resilience as "an ability to recover from or adjust easily to 'misfortune' or change." The 10 habits include: "Think well, live well," "See the light in the darkness," and "Recharge your batteries." Owen suggests these habits can be used in a planned and unplanned crisis and can also be applied if you are in a situation of sustained pressure.

Chapter 6, "Recharge your batteries: the power of recovery," was my favorite group of exercises. Owen suggests taking frequent rest breaks even if you do not feel tired. It is important to break your tasks into mini tasks and take a five-minute break every hour. He also suggests reducing your working day by delivering five stellar hours of work each day. Then, you can use the rest of your day for networking and creative thinking. Owen supports these ideas with facts showing that walking outside, for example, generates better creativity than sitting indoors or even walking on a treadmill. That supported what I have recently heard that if you want to memorize something, you will more easily memorize the content if you move your hands and your feet. Another tip is to avoid multi-tasking. Your brain can only effectively focus on a single task at a time. Owen states that your productivity falls by up to 40 percent when you try to multi-task (p. 139).

I found Exercise 30, "Manage your energy flows," to be a concept that is rarely mentioned. Owen suggests using a four-zone grid to monitor and manage your energy over the short and long terms. After completing the grid, he suggests you focus on the Recovery zone. Owen notes that even professional sports players take time to recover. Perhaps you have found yourself in the Survival zone during this COVID-19 crisis. If so, it is important to take time to recover and increase your resilience.

To live well, Owen suggests the power of optimism is a matter of life and death (p. 3). One exercise he suggests doing is cultivating an attitude of gratitude. At the end of each day, think over your day and recall the good things that happened. Then, write down three things for which you are grateful. Owen says you will see changes happen. You will first discover you are sleeping better. Over time, you will find you are cultivating an attitude of gratitude.

Resilience: 10 habits to thrive in life and work is a book that can help you make a difference in your life.

Rhonda Lunemann
Rhonda Lunemann is a technical writer with Siemens Digital Industry Software, a senior member and serves on the Program Committee of STC's Twin Cities Chapter, and a member of the MN (Minnesota) Bot Makers.

UX on the Go: A Flexible Guide to User Experience Design

Andrew Mara. 2021. Routledge. [ISBN 987-0-367-22862-0. 224 pages, including index. US$42.95 (softcover).]

UX on the Go: A Flexible Guide to User Experience Design is a comprehensive book that emphasizes an agile approach to incorporating usability throughout a product, website, or application's development cycle. Sprints emphasize planning and commitment and stand up meetings facilitate a team approach to usability. Andrew Mara's prescriptive method stresses the importance of putting users first at every step of the process. He neatly walks user experience (UX) practitioners and students through the tasks of assembling a team, recruiting participants, collecting user experience data, and creating sketches, wireframes, and prototypes.

The book is broken into 16 chapters, which provide step-by-step information about everything from assembling UX team members, running effective meetings, and implementing usability development, evaluation, and test methodologies. For example, in a chapter about organizing qualitative data gathered through contextual observation, Mara explains how to conduct an Affinity Wall Sprint (which breaks down steps users take to achieve their goals) by listing the number of participants needed, the time the sprint will take, the necessary materials, the group roles, and the steps needed to conduct the activity. This organizational method is used throughout *UX on the Go* and provides readers with concrete strategies that emphasize team success.

Each chapter includes at least one challenge where readers/practitioners can apply the concepts discussed. Challenge #7, for instance, encourages the use of a trivia contest to help the team better understand the users by creating questions that include "surprising or quirky insights" about them (p. 120). This activity turns what could be a mundane activity into one that is fun and interactive.

One of the many strengths of *UX on the Go* is the use of case studies to demonstrate usability practices in action in both industry and academia. One student team partnered with seven public high schools in Puget Sound, Washington, where they took a participatory approach to developing a social robot for teens. Through their UX research, they were able to develop prototypes that informed the robot's features. In another case study, the Client Experience Team at the Mayo Clinic used personas to improve the usability of a specimen processor by examining the user's procedures for logging specimens and the constraints and challenges of the user's position at the Clinic.

Although reviewers of the *UX on the Go* have referred to it as a textbook, it is more of a handbook for both students and practitioners. References are provided at the end of each chapter for those who want to delve deeper into the subject matter. A comprehensive index and detailed table of contents makes it easy to dive into the book, allowing readers to access information for whatever stage in the usability process they may be. This book fills a gap in the current usability literature and will make a fine addition to your UX library.

Lynne Cooke
Lynne Cooke is a Clinical Assistant Professor at Arizona State University where she teaches courses on usability, digital media, and portfolio development. She is also a member of the Arizona Chapter of STC and the Internship Coordinator at ASU.

A Research Primer for Technical Communication: Methods, Exemplars, and Analyses

George F. Hayhoe and Pam Estes Brewer. 2021. 2nd ed. Routledge. [ISBN 978-0-367-53148-5. 316 pages, including index. US$ 62.95 (softcover).]
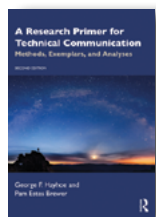
At a time when technical communicators are extending research efforts into new topics, it's heartening to see a new edition of *A Research Primer for Technical Communication: Methods, Exemplars, and Analyses*. George Hayhoe and new co-author Pam Brewer have increased the text's usefulness through judicious rewriting and valuable additions.

The basic structure of sections remains unchanged: (1) "Methods" contains two chapters defining research and research phases, followed by separate chapters describing several types of research; and (2) "Exemplars and Analyses" illustrates those types by reprinting journal research articles and analyzing them.

Thus, Chapters 3 through 7 show, respectively, how to prepare and read a literature review, a quantitative research report, a qualitative research report, a survey, and a usability study. Chapters 8 through 12 run parallel to the five earlier chapters, each assessing its sample illustrative article in close detail.

The studies analyzed in the first edition all came from *Technical Communication*. The studies now come from *IEEE Transactions on Professional Communication*, *Technical Communication Quarterly*, and *Journal of Usability Studies* as well as *Technical Communication*.

The authors' treatment of survey research exemplifies how they work. In the chapter "Conducting Surveys," they introduce the overall structure of an effective survey, strategies in writing several kinds of questions, and proper reporting of results, with many tips—"Provide a neutral or opt-out choice in any closed question" (p. 118). Then, in the chapter assessing a survey report, they provide dozens of organized comments on structure and intended audience, question types used, and various strategies followed in reporting results. Both chapters contain challenging exercises.

Although the authors have retained many paragraphs as originally written, they have made many excellent changes and additions. For example, ANOVA (Analysis of Variance) receives only half a page of discussion in the first edition but now gets 10 pages of strong detail. I'm especially happy to see the addition of the timely chapters on usability studies, which are reason enough to replace your old copy.

The index is shorter than in 2008 but still totally adequate. The discussion of citation styles has been moved from the opening chapter to an appendix. I applaud this decision but would go further myself and remove these pages altogether, because they are at best tangential to the core information that gives the book its special value.

I recommend *A Research Primer for Technical Communication* as perhaps the best available resource of its kind. It's a good fit for teachers and students in research-based technical communication courses as well as for professional technical communicators who must conduct research. The book is also a solid resource for professionals in any field who must work with literature reviews, quantitative or qualitative studies, surveys, or usability projects.

Avon J. Murphy

Avon J. Murphy is an STC Fellow and technical editor in western Washington. A retired college professor and government writer, he is a contractor and principal in Murphy Editing and Writing Services, specializing in computer and Web technologies. Avon served as book review editor for *Technical Communication* for 17 years.

Design and Agency: Critical Perspectives on Identities, Histories, and Practices

John Potvin and Marie-Ève Marchand, eds. 2020. Bloomsbury Visual Arts. [ISBN 978-1-350-06379-2. 304 pages, including index. US$115.00 (hardcover).]

Design and Agency: Critical Perspectives on Identities, Histories, and Practices is a collection of 20 essays, edited by John Potvin and Marie-Ève Marchand, that examines the role of agency on design and designed objects. This book brings together authors from a range of backgrounds, both professionally and geographically. The content was initiated by a symposium held at Concordia University in Montreal in 2018, though the editors indicate that the book itself has grown beyond its origin. Historically design has been examined as an expression of the "haves" rather than the "have nots" but *Design and Agency* explores topics in design from

history, to theory and practice from the perspective of a variety of identities.

In the introduction, Potvin states, "Agency is not monolithic, unidimensional, or unidirectional, making it a rather tricky, slippery, and wide-ranging field for analysis" (p. 2). He is not wrong, as the essays collected for *Design and Agency* are extremely varied in their approach. Historically most topics in design have been examined strictly through the lens of the white, European male perspective limiting the perspectives of minorities, both in terms of race and sexuality, who negotiate designed objects and spaces differently. The role of examining design through the lens of agency adds depth as this unique approach includes analysis, through a variety of identities, "formed through gender, sexuality, race, and class" (p. 2).

The collection is broken into two sections; in the first section, Designing Identities, there is a variety of design and craft practices presented in the essays, including interior design, furniture, murals, embroidery, and architecture, among others. But perhaps the one essay that doesn't seem to fit with others in this section is "Desperately Seeking Sunlight: Le Corbusier's Casa Curutchet and *The Man Next Door*" in which the author ostensibly uses Casa Curutchet to examine the agency of the house in the film. However, it seems to be more an examination of spaces and their symbolism in film than any specific examination of the agency of Casa Curutchet. The second section, Systems and Institutions of Design, transitions to essays that explore the hegemony of institutions and their role in academic practices of design. Topics include the impenetrable jargon used for academic publications in "Textual Agency: Pitfalls and Potentials" and the expectations for academics and rigorous practices and the difficulties this can create for the differently abled in "Design History and Dyslexia".

In *Design and Agency,* by examining design through the lens of various identities, the authors and editors are providing a potential new framework approaching how design history, theory, and practice is researched and taught. This book will be an excellent resource for instructors and academics who are looking for new approaches to these design topics. The analysis of agency expands the breadth of the field and offers a new approach that has the potential to overturn the canon of design and to begin disrupting existing paradigms,

which seems timely given the current rise in social movements to address inequality.

Amanda Horton

Amanda Horton holds an MFA in Design and currently teaches graduate and undergraduate courses at the University of Central Oklahoma (UCO) in the areas of design history, theory, and criticism. She is also the director of the Design History Minor at UCO.

Story Power: Secrets to Creating, Crafting, and Telling Memorable Stories

Kate Farrell. 2020. Mango Publishing Group. [ISBN 978-1-64250-197-1. 272 pages, US$18.95 (softcover).]
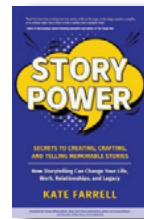
Kate Farrell was encouraged to update a book she wrote in 1979—*Word Weaving: A Storytelling Workbook*—with new storytelling content and purpose. The result is *Story Power: Secrets to Creating, Crafting, and Telling Memorable Stories* where she addresses five topics to help us connect and stay connected with people around us: Childhood and coming-of-age stories; stuff we are made of; family stories (folklore, secrets, shadows, and legacy); technique and delivery (seven steps to storytelling); and heritage of folklore.

Within the book's chapters and sections, there are tips and insight for creating, crafting, and telling stories, plus exercises and prompts to help you find stories that fit your style and purpose. Farrell uses stories and snippets from more than 20 authors to provide examples of writing styles and to help explain the elements of creating, crafting, and telling stories.

For those of you interested in "telling" a story instead of writing it, you might want to jump right to Chapter 4. Here you will learn seven proven steps for storytelling, which includes essential features that make a personal narrative effective and memorable. Farrell also addresses delivery techniques for conversational storytelling and professional storytelling.

As Susan Wittig Albert says in the book's Foreword, "As we reveal ourselves in story, we become aware of the continuing core of our lives under the fragmented surface of our experience. . . . Our stories are *not* the experiences themselves" (p. 13). Whether you are

simply journaling as a way to sort through life's ups and downs, searching for ways to heal emotional wounds, or you endeavor to incorporate storytelling into your personal or professional life, you might find inspiration in *Story Power*.

Michelle Gardner

Michelle Gardner, CPTC, is an STC member and the marketing content writer for USDM Life Sciences. She has a bachelor's degree in Journalism: Public Relations from California State University, Long Beach, and a master's degree in Computer Resources and Information Management from Webster University.

Older and Wiser: New Ideas for Youth Mentoring in the 21st Century

Jean E. Rhodes. 2020. Harvard University Press. [ISBN 978-0-674-24807-6. 212 pages, including index. US$35.00 (hardcover).]
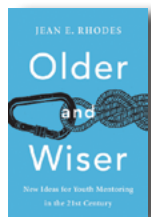
Jean E. Rhodes is Professor of Psychology and Director of the Center for Evidence-Based Mentoring at the University of Massachusetts Boston. She also co-founded the European Centre for Evidence-Based Mentoring and is a Fellow of the American Psychological Association. She has studied and written about youth mentoring for decades.

In *Older and Wiser: New Ideas for Youth Mentoring in the 21st Century*, Rhodes discusses mentoring research and relays something of value to a wide audience to include teachers, parents, and students. She provides information about how to help young people including disadvantaged young people in need. Rhodes also provides ideas about what does not work when it comes to mentoring today. Let's also note that Rhodes mentions mentors can be "natural" as a teacher or counselor or part of a program such as Big Brothers/Big Sisters.

So, what does good mentoring today mean to Rhodes? Part of the answer Rhodes provides is to consider technology-driven interventions as well as an accountability model. She notes that there are many technology-driven interventions that can help, which can include apps that help with mental health issues.

These approaches, however, should include "check-ins, monitoring, troubleshooting, and other interactions" (p.106) to be effective. While these can be great tools, what is really needed is a human being who encourages use of the tools and follows up on use of the tools. Even simple reminders dramatically increased the effects of app-based interventions "(0.15 versus 0.39 for anxiety; 0.18 and 0.32 for depression)" (p. 107).

While Rhodes has a focus in *Older and Wiser* on data, she also mentions engaging personal stories. One of these is about someone who helped her as a mentor. George Albee was the mentor who taught an introductory psychology class and later taught other classes Rhodes attended, ultimately causing Rhodes to conclude: "Albee saw potential in me, and, over time, that changed me. My sense of self shifted from a Jersey girl with an uncertain identity and modest ambition to someone who could and should try to make a difference in the world" (p. xi).

Jeanette Evans

Jeanette Evans is an STC Associate Fellow; active in the Ohio STC community, currently serving on the newsletter committee; and co-author of an Intercom column on emerging technologies in education. She holds an MS in technical communication management from Mercer University.

The New Roadmap for Creating Online Courses: An Interactive Workbook

Catherine R. Barber, Janet K. McCollum, and Wendy L. Maboudian. 2020. Cambridge University Press. [ISBN 978-1-108-72031-1. 229 pages, including index. US$29.99 (softcover).]
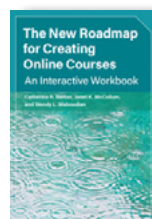
The New Roadmap for Creating Online Courses: An Interactive Workbook is a guide for developing post-secondary level online courses. With the demand for online instruction increasing, this book is a valuable resource for instructors and instructional designers who are either moving their face-to-face courses online or creating new courses to be delivered online.

This is an instructional and interactive workbook, with space for course developers to answer questions and record your ideas. Course development is

represented as a journey, and the terms and ideas introduced follow this theme. Course assessments are milestones, and course creation tips are "Travel Advisories." Besides filling out the workbook, following along on the journey involves creating a course log, where you create learning activities and collect and develop course resources, which the workbook helps you transform into a successful online course. The book provides ample examples of learning activities, course modules, and rubrics.

The workbook focuses on creating meaningful learning opportunities for adult learners, defined as students over 17. Adult learners value collaborative, practical projects, and the workbook encourages you to create learning activities that are "realistic, relevant, and meaningful" (p. 149). In the "Exploring the Terrain" sections, the authors explain how their guidelines are rooted in pedagogical research, from John Dewey's 1916 book *Democracy and Education: An Introduction to the Philosophy of Education* to the National Academies of Sciences, Engineering, and Medicine's 2018 research into how people learn.

Instructors know that changes must be made after each course iteration. Catherine Barber, Janet McCollum, and Wendy Maboudian recognize the importance of revision, and incorporate this step into their Change-adept Course Creation Process. This is a non-linear process composed of three major stages: preparation, creation, and revision. The workbook encourages adaptability and flexibility. While major revisions or changes that would affect the syllabus should be reserved for post-course revision, the authors' process encourages you to be flexible and be open to minor revisions to the course, even mid-course, if it helps student learning. The process also involves mindful self-reflection. On this journey, you will reflect on your course, your students, and yourself often.

I like that the course development process encourages you to tailor your course to your students, prompting you to survey students about their knowledge and interest in the subject being taught and their other commitments. Many opportunities for collaboration with colleagues are also built into the process. The "Call a Colleague" sections in each chapter prompt you to seek feedback from your peers on your course development.

The course creation journey in *The New Roadmap for Creating Online Courses* is thorough, yet easy to follow and backed by sound pedagogical research. After working through the workbook, you can have a well-designed, engaging online course ready to load into your institution's learning management system.

Elizabeth Hardin

Elizabeth Hardin is an STC Member and a lecturer in the English department at the University of Alabama in Huntsville, where she teaches technical and business writing. She has a master's degree in English and a bachelor's in Computer Science.

Data Analysis, Interpretation, and Theory in Literacy Studies Research: A How-to Guide

Michele Knobel, Judy Kalman, and Colin Lankshear, eds. 2020. Stylus. [ISBN 978-1-97550-212-6. 275 pages, including index. US$34.95 (hardcover).]
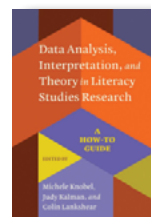
Data Analysis, Interpretation, and Theory in Literacy Studies Research: A How-to Guide is an engaging collection of writings from multiple researchers that takes an in-depth look into the nuances of qualitative literacy studies in lay terms, making it easy to understand. Sounds like a snooze-fest, right? Well, what if I told you there is research involving Xbox, *Harry Potter*, and even memes? Although literacy based, this book offers valuable information that is applicable to the world of technical communication through a scholarly, yet down-to-earth manner.

The editors use chapter 1 to provide an overview of the following chapters, each one containing a different project. This is a perfect solution to finding which sections contain useful information.

Chapter 3 is a humorous study centered on conversations between gamers on Xbox Live. It takes an interesting perspective that considers what cues we miss during virtual conversations that only use audio. Large groups can have one conversation split into multiple, similar conversations through "resources such as gaze, posture, and proximity" that allow us "to focus attention on one conversation over the other" (p. 40). The chats lack these cues, so participants took turns

talking in short dialogues and would state who they were directly talking to or use context clues to imply the recipient.

Chapter 9 discovered *Harry Potter* fan-fiction writers on the autism spectrum disorder used their stories to challenge stereotypes. Some stories displayed characters that were aggravated upon hearing sensitive language about autism when autism was not referred to as a strength. One character combatted the frustration by noting his academic excellence. Researchers note "how we talk about something . . . reveals our values and biases, conscious or not" (p. 174).

The book concludes in Chapter 11 with a captivating examination of memes. The researchers found that "the texts and images we produce or find and pass on…are generated out of networks of shared experiences, worldviews and values" that draw on text and images to progress the movement of "cultural artifacts" (p. 216). They noted that language itself contains no meaning, but the context and culture it is in produces a unique tone that fits into a larger context.

Data Analysis, Interpretation, and Theory in Literacy Studies Research provides strong insight into how communication and group work function from which introductory technical communicators can benefit. In an easy-to-digest manner you can learn how to better communicate with subject matter experts, appropriately discuss sensitive manners, and understand written tone. Consider reading this book if you want an engaging learning experience that provides some humor along the way through its use of modern research and pop-culture references.

Jessica Comer

Jessica Comer is a graduate student at the University of Alabama in Huntsville. She has only performed book reviews for collegiate level classes.

The Future of the Self: An Interdisciplinary Approach to Personhood and Identity in the Digital Age

Jay Friedenberg. 2020. University of California Press. [ISBN 978-0-520-29848-4. 330 pages, including index. US$39.95 (softcover).]

How is technology changing the self? In *The Future of the Self: An Interdisciplinary Approach to Personhood and Identity in the Digital Age*, the answer takes three basic forms: 1) we gradually change ourselves through our online behavior, creating idealized avatars or inventing different personas in *Second Life*; 2) we create increasingly complex physical systems like robots, artificial intelligence (AI) networks, and androids that seem to develop their own consciousness; and 3) we physically repair or enhance our bodies through prostheses that alter our physical and psychological selves, converting us into cyborgs.

In all three cases, the fundamental question is how consciousness, or the self, arises from the material body or from objectively discernible physical operations of the brain. Because "Consciousness is the subjective awareness of one's experience" (p. 234), and science cannot fully comprehend subjective consciousness through objective methods, the result is an "explanatory gap" (p. 234). Although science can analyze "neural correlates of consciousness" by "mapping objective patterns of activity in the brain with subjective reports of qualia" (p. 234), it cannot establish precisely how and when consciousness arises.

The "explanatory gap" may be insuperable. Theoretically, any underlying physical system, whether biological, mechanical, or electronic, if complex enough, should produce an emergent property greater than the sum of its parts, such as the self or consciousness. The philosopher John Searle's famous Chinese room thought experiment argues otherwise. If a Chinese speaker slips messages in Chinese to a respondent on the other side of a wall and receives satisfactory answers, it appears that the respondent—whether human or computer—knows Chinese. But the respondent speaks only English, and merely consults a dictionary and follows English instructions telling him how to answer in Chinese, essentially obeying an algorithm but without understanding the language. Even as complex a system as language does not generate

emergent properties: "semantics (meaning) cannot come from the execution of syntax (grammar)" (p. 240). Despite "extensive counterarguments" (p. 240) against Searle's position, no one has yet explained exactly how consciousness emerges from physical processes alone, however complex.

Even if we could create an immortal self in cyberspace—the goal of many AI theorists and engineers—should we do so? A truly immortal self would devolve into nihilism because, lacking finitude, it would lack purpose and meaning: "Endings give meaning to life" (p.288). Artificial selves, therefore, "cannot be indestructible robots" (p. 236): they must have finite lives—be embodied in some way—or their existence is meaningless. So, the question remains: how extensively should we integrate technology and the self?

The Future of the Self presents a comprehensive, authoritative, and detailed survey of scholarship on this question, covering philosophical and psychological concepts of the self; how machines can evolve into artificial persons; the varieties of conceivable software selves; how the brain maps different affective states; transhumanist possibilities and pitfalls; and the legal and ethical issues of human-machine interaction. Thanks to its critical, balanced perspective and its thoroughness, this accessible yet scholarly volume on the future of the self is valuable to specialist and generalist alike.

Donald R. Riccomini

Donald R. Riccomini is an STC member and Emeritus Senior Lecturer in English at Santa Clara University, where he specialized in engineering and technical communications. He previously spent 23 years in high technology as a technical writer, engineer, and manager in semiconductors, instrumentation, and server development.

Not My Thing—Gender in Design (Nicht mein Ding—Gender im Design)

Katharina Kurz and Pia Jerger, eds. 2020. HfG-Archiv Museum Ulm. [ISBN 978-3-89986-327-7. 212 pages. US$39.00 (softcover).]

Unless you are a design student or artist by trade, the story of how design for gender developed in Germany has likely been unknown to you. After reading this bi-lingual book of demonstrations, theses, and work of gifted design students archived over a period of years, you'll no longer be able to claim ignorance of the topic covered in *Not My Thing—Gender in Design*.

The authors have arranged vivid presentations by categories, such as home furnishings, education, and medicine. These were extracted from the HfG school's archival materials to demonstrate the varied and diverse needs of the worlds' population. Typically, men, women, and children have learned to adapt to available designs or accept a generic model. If you prefer to dress your children by gender, you can buy pink or blue clothes and games in that same color scheme. Two full-color photos show how prevalent these choices are, thereby indicating how difficult it might be to find other color options. Personal care items, seating, and medical equipment address needs and preferences that also affect the under-served LGBTQ community. One picture in this book demonstrates a unique design for a prostrate exam table.

Why should this rather controversial subject be of interest to technical communicators? Consider whether your company manufactures tools, furniture, kitchen appliances, computers, or toys. Do they attempt to serve many genders? What color is the handle of your drill? Certainly, we are accustomed to living in a residence designed with some other client in mind. And likely you have noted that car crash dummies are all long waisted? How comfortable is the shifter location if you are short waisted? Perhaps in today's world, technical companies need to consider designs for multiple markets or clientele.

Activities and design projects included in *Not My Thing* let students create their own puzzles and toys, or let people choose the color of plastic preferred to build a tulip chair (incidentally, a high female gender

response of pink was atypical, with neutral, masculine design being the norm).

Most technical communicators do not have the luxury of getting customer input at the outset of the product development process. However, salespersons have historically surveyed existing customers for input. And websites and chats can provide a means for collecting random responses post design. Would your research make an interesting white paper on a blog site?

Readers should be prepared for thought-provoking presentations. Also prepare for the small narrow font, tight line spacing, and multiple columns used to accommodate this bilingual work of art. The heavy-duty paper treated to accept color print is laid out with sections of tone-on-tone type, making text even harder to read. *Not My Thing* feels like taking a trip to the museum and having to stop and read all the cards. I found it well worth the effort.

Donna Ford

Donna Ford has been an STC member and a technical writer in the hardware, software, and government healthcare industries. She holds an Information Design certificate from Bentley College. Donna is an author who also reviews books online for the US Review of Books.

Dare to Ask: Learn to ask questions like a pro

Els Dragt and Jeroen Timmer. 2020. BIS Publishers. [ISBN 978-90-6369-562-0. 146 pages. US$16.99 (softcover).]
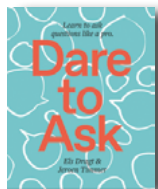
I was drawn to *Dare to Ask: Learn to ask questions like a pro* because it is designed to be both mentally and visually stimulating by using both words and illustrations. I find books that do this well are more accessible to a variety of readers because it allows the author(s) to break down complex ideas and emphasize key points.

Dare to Ask used a variation of fonts, font weights, font sizes, and character/line spacing. These variations made it easy to discern chapter breaks, subject breaks, key points, content, and supplemental information such as quotes. Most notably, the header that was present on each page made it easy to determine what that page would cover and, in addition, both pick up and put down this book with each page being a clear stopping point. I believe these choices allowed Els Dragt and Jeroen Timmer to break down complex information into simple, easily digested pieces of information that make the book accessible to all readers.

For the illustrations, bold colors were used—teal and orange—which drew the eye but could also be harsh to look at. I think these colors were used best when they only covered one page and were paired with black or white. But, in some places, these colors were used together and/or would span two pages which I found harder to appreciate. With that said, there were several illustrations that I truly enjoyed such as the illustration on page 21 of a man with an iPhone in the middle of his face which was paired with content about always being connected and how that's affected our ability to interact with those around us. I felt this illustration emphasized the key points in the corresponding text which, for me at least, provides me a moment to reflect on the key takeaways.

While the book title suggests this book is about questions, it's about how to converse and engage with others using questions. In a world where our screens are ever-present and Google is available to answer all our questions, the art of a face-to-face conversation doesn't come naturally for all of us. *Dare to Ask* sets to remedy that by explaining how questions can drive a conversation. The examples, however, often are based on pre-pandemic social standards. I expected at least one page to be dedicated to the complications or changes to conversations that have arisen from the pandemic. While most of the content is still relevant, I felt that avoiding this topic was a missed opportunity to make the content relevant and timely in 2020.

In conclusion, *Dare to Ask* was a great book that breaks down how to use questions in your conversations to both gather information about and connect with others.

Sara Buchanan

Sara Buchanan is an STC member and a content strategist at LCS in Cincinnati, OH. In her free time, she's an avid reader, and enjoys cooking and doting on her cats: Buffy and Spike.

The Big Leap: A Guide to Freelancing for Creatives

Martina Flor. 2020. Princeton Architectural Press. [ISBN 978-1-61689-956-1. 160 pages. US$19.95 (softcover).]

Not often do you pick up a book and immediately sense the personal care, the attention to detail and design, the craft of the printed book itself. *The Big Leap: A Guide to Freelancing for Creatives* is one such book. The pages, printed with two spot colors (blue and red), contain photographs and many examples from the author's own creative work in lettering—the art of drawing words, which differs from calligraphy, an artistic form of writing. Martina Flor runs a lettering and font design business (Studio Martina Flor) in Berlin. Her employees worked on the book, designing the cover and page layout, taking the photographs, and managing the project. The book itself is pleasing to the eye and fun to read, thanks to their skills.

Originally written in Spanish and published in Spain as *El Gran Salto*, this book has an international focus throughout, but one section (p. 47) specifically addresses "Working in Different Markets," including paying attention to how "standards and practices" vary and noting that in these instances you may have to educate your clients carefully about how you work. (The book is also available in Portuguese and is forthcoming in German.)

The conversational tone and chunked topics make for a quick read. The early topics vary from what it means to be a freelancer to how to decide on making *The Big Leap* from employee to sole proprietor. After that, the book moves to practical business approaches: getting clients, generating income (such as tangential projects like teaching and speaking), and managing time between the artistic work itself and the business administration. The final chapter outlines how to grow the business.

Flor writes directly to designers, photographers, and studio artists, but most of the information also applies to writers considering freelancing, including technical communicators—albeit in a more general fashion. The text is introductory in nature, so it's perfect for those who know little about freelancing. As such, American readers will quickly note there is nothing about the legal side of creating a business, nothing about business

licenses, taxes, or incorporating. However, Flor does address money: pricing your work. She knows that freelancers in creative fields typically love their work and thus would practice their art even for low or no compensation. She warns us readers to "assign a sufficient and fair monetary value to your work" (p. 111). Practice advice like this abounds.

She also addresses business communication, including how to email clients properly and professionally, including billing and contracts, but all of this is conveyed in a general sense, as if you were engaged in conversation. The text avoids business jargon.

Since most readers of *The Big Leap* must be considering a professional change, Flor includes a few simple activities to help envision work and life as a freelancer. These exercises are more like daydreams than business plans, but in the beginning, isn't dreaming of a different way of working the point?

Kelly A. Harrison

Kelly A. Harrison, MFA, teaches technical communication at Stanford University. In collaboration with a colleague, she recently received an NEH grant for curriculum development at San José State University, where she has taught a range of writing courses. Kelly has written print and online content for various high-tech companies.

Words Matter: Meaning and Power

Sally McConnell-Ginet. 2020. Cambridge University Press. [ISBN 978-1-108-44590-0. 320 pages, including index. US$26.95 (softcover)].
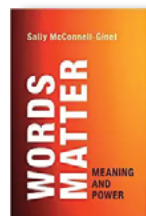
"Most people like to think of language as just 'there,' as neutral" (p. 207); however, Sally McConnell-Ginet clearly explains in *Words Matter: Meaning and Power* that language is far from neutral. She powerfully illustrates the connection between language and social practices, and invites readers to critically examine their own words and ideas about the language they use.

Through contemporary, national examples, McConnell-Ginet addresses language issues that plague America today, such as shifting ethnic/racial labeling, sex/gender labels, marking and erasing certain

populations, Black Lives Matter, reciprocal forms of address, slurs, sexism and racism, the politics behind dictionaries, and dangerous speech. Many, if not most, Americans are well-meaning in the words they choose when speaking to and about people other than themselves. However, many people are not aware of or understand historical roots and how social issues and trends affect language. There is a fine line between explaining the history and meaning behind certain words and making readers feel uncomfortable or defensive about their own linguistic practices; this is where McConnell-Ginet shines. She does an excellent job of explaining the way "norming" creates a standard and everyone else a deviant or derivative of that norm. Norming practices lead to marking and erasing certain people, which lead to more dire consequences for people who are already marginalized. Without telling readers what they "should" do, she explains the rationale behind certain labels like cisgender and helps them explore the possibilities and implications for gender identification.

There are also discussions that help readers understand common practices like name calling, where nouns versus adjectives are the basis of racial and ethnic slurs, but avoiding nouns and sticking with descriptions (adjectives) has led to people-friendly practices like the "people-first strategy" (p. 45). Likewise, although the idea of colorblindness seems to be a linguistic move that is compassionate toward people of color, McConnell-Ginet explains how "attempted colorblindness and associated colormuteness can make it more difficult for people actually to notice racial discrimination, which is essential for doing anything about it" (p. 88). Skin color does not need to disappear from anyone's sight; what needs to change is how skin color leads some people to "draw conclusions about a person's intelligence, talents, tastes, or general worthiness" (p. 89).

When talking about words and their meaning, the issue of freedom of speech generally enters the conversation. Although some people may see discussions about the meaning and power of words as infringing on their right to freedom of speech, *Words Matter* is an intelligent discussion about the consequences of language without giving prescriptive directives. "It is *because* words matter that freedom of speech matters" (p. 279); therefore, understanding how language can tear apart a

country—as well as heal a country—makes this book highly recommended for all adults.

Diane Martinez

Diane Martinez is an STC senior member and an associate professor of English at Western Carolina University where she teaches technical and professional writing. She previously worked as a technical writer in engineering, an online writing instructor, and an online writing center specialist.

Writing Your Psychology Research Paper

Despite the title and the contents of other books in this series, *Writing Your Psychology Research Paper* focuses on writing classroom papers based on library research, not empirical research, and is most suitable for undergraduates. Though it can support empirical research writing, better books are available for that purpose.

Scott Baldwin begins (Chapter 1) by describing how brainstorming helps writers to choose a topic and narrow the focus until that topic has a manageable scope. Chapter 2 provides a good overview of literature searches, though it's no substitute for the fuller treatment in Susanne Hempel's book (reviewed in *Technical Communication 67*(2)). Baldwin provides good advice on search keywords, but reminds us of the continuing importance of librarians and libraries in this age of Internet searches and of the need to assess information quality, based on both the quality hierarchy (peer-reviewed journals at the top) and critical judgment, such as scrutinizing research methods. Even good journals sometimes publish questionable papers. Chapter 6 complements this chapter by clarifying when citations are necessary, how to avoid unintended plagiarism, and how to use software like Zotero to manage references.

Chapter 3 carefully distinguishes a topic (the subject) from a thesis (opinions on that topic) and illustrates how a thesis emerges from synthesizing the literature review and how a paper emerges from organizing the results to support the thesis. One useful

trick: to summarize each chosen paper based on what the authors did, how they did it, what they found, and the paper's limitations, including both limitations the authors report and limitations you identify through critical reading.

Although Chapter 3 emphasizes the importance of an outline for organizing thoughts and facilitating writing, it doesn't describe the highly iterative process of outline development, with rigorous evaluation followed by revision to improve the outline's effectiveness. Most outlines must be revised repeatedly to support efficient writing. The example outline Baldwin provides is too general. Though it goes beyond a simple list of headings, it relies on questions rather than statements of what will actually be said. Thus, it illustrates an early step in outline development, not the final outline that should be created before beginning to write.

Chapter 4 ties the outline to a typical scientific paper's structure and uses the effective analyze–evaluate–compare–synthesize approach to writing. Chapter 5 describes the revision process, based on well-known principles such as presenting one topic per paragraph, but doesn't sufficiently emphasize the iterative nature of revision. Baldwin ends with an insightful and helpful discussion of how to fight procrastination.

Writing Your Psychology Research Paper provides a solid foundation for learning to write classroom papers, accompanied by many clear examples that illustrate the principles. It will also provide a solid foundation for learning to write more demanding peer-reviewed papers.

Geoff Hart

Geoff Hart is an STC Fellow with more than 30 years of writing, editing, translation, and information design experience. He's the author of two popular books, *Effective Onscreen Editing* and *Writing for Science Journals.*

Law and Authors: *A Legal Handbook for Writers*

Jacqueline D. Lipton. 2020. University of California Press. [ISBN 978-0-520-30181-8. 264 pages, including index. US$22.95 (softcover).]

In *Law and Authors: A Legal Handbook for Writers*, Jaqueline D. Lipton focuses on the legality and permissibility that contemporary writers must face before publication. This book offers extensive knowledge on the specific rules that writers must follow in today's digital world and speaks on each writer's intellectual rights. Lipton extends her law school knowledge to young, emerging writers. Introductory topics cover copyrighting, ghostwriting, and freelancing. In today's world, e-books and self-publishing are popular, but what rights do you have versus what rights do you give up in the process? Is fanfiction legal? What exactly can be copyrighted in a digital media age? Lipton acknowledges these present-day concerns and makes sure we as writers realize our rights.

As writers, the world inspires us. From a book quotation, a conversation, a painting, or a movie scene, creativity strikes. When we are reading, watching, overhearing, and communicating, we invent new ideas from older ones. But as writers, are we allowed to write anything we want? Do our ideas belong to us or do they belong to who inspired them? What rights do we have when we are writing for someone else? Lipton's book gives an introduction on work-for-hire positions, ghostwriting, and intellectual property (IP) projects. It offers present-day examples to showcase how writing for someone else transpires. Ghostwriting is usually referred to as writing for a famous person. But here, Lipton notes, "Anyone who has a story to tell but doesn't have the skill or the time may choose to hire a ghost" (p. 55). Lipton discusses how and when to receive credit and acknowledgement when writing for someone else.

As you read further, the author describes how to protect authors with topics on trademarking, specific fair usage, and contracts. As a young or new writer, specific rules and regulations may only be told to us by our agents, our writer friends, or through late-night Google searches. After writing, all we want to do is to become published. Lipton offers paramount insight on the laws of publishing with agents versus. self-publishing.

Digital technology requires authors to market their brand and use all social media platforms. *Law and Authors* discusses the pros and cons of using social media to interact with your fans, readers, and clients. When authors want to use photographs and images that belong to other artists, are these photographs copyrighted? Seeking permission is often the hardest part, but Lipton gives us useful tips on how to sail the stormy trademarked seas.

Writers of all kinds, from academia to storytellers, will benefit from *Law and Authors*. Lipton offers the most

current laws on publication and creative works, thus also providing a notable read for educators and marketing managers who use copyrighted images and texts.

Giannina Jensen

Giannina Jensen is a graduate student who is currently studying technical communication with an emphasis in user experience and social media at the University of Alabama in Huntsville. She enjoys editing science manuals and reading an abundance of topical nonfiction.

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STC Online Courses	6
STC Summit Pre-Conference Courses (full day)	6
STC Summit Pre-Conference Courses (half day)	3
STC Annual Summit	8
Begin and complete a college-accredited course related to the Technical Communication field	8
Published articles that relate to any aspect of *Technical Communication* (2/article)	2
Published books publicly available on topics related to *Technical Communication* (5/book)	5
Presentations at conferences related to aspects of *Technical Communication* (2/presentation)	2
Total needed within 2 years post-certification date	12

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